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SCIATIC NERVE PALSY IN NEWBORN INFANTS

REPORT OF A CASE

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Baby B. was born in the Germiston Hospital on 15 June 1954. His mother, a multipara aged 33 years, had been admitted on 9 June with severe pre-eclamptic toxaemia in the 34th week of her pregnancy. After labour had been induced surgically, a placenta praevia was detected and a lower-segment Caeserean section performed. The baby was easily delivered, without traction on the legs, but showed signs of asphyxia, and was resuscitated with oxygen and an injection of 1 c.c. of nikethamide (coramine) into the umbilical cord. His weight was 4 lb.

The following day it was noticed that the baby did not move the right lower limb, and that there was induration and oedema of the right buttock. It was verified that no injection had been given into this buttock. Further examination disclosed complete paralysis of the anterior and posterior tibial muscles, the peronaei, and the flexors and extensors of the toes; and marked weakness of the calf muscles. The plantar reflex was absent and the skin of the sole and dorsum of the foot appeared to be anaesthetic. The circulation of the limb seemed normal. A diagnosis was made of sciatic-nerve palsy, probably due to thrombosis of the inferior gluteal artery. A small plaster splint was applied to control the drop-foot deformity. Within 7 days, the induration of the buttock had disappeared but, 8 months later, there has been little recovery in the nerve palsy. The right leg is wasted and is slightly shorter than the other. A plaster night-splint is still worn, and has prevented the development of any equinus deformity. It is hoped that some further recovery will still take place.

Paralysis of the sciatic nerve in newborn infants does not appear to have been described in the literature until as recently as 1949, when Mills[1] published his findings in 8 cases born in the Birmingham Maternity Hospital between December 1946 and October 1947. In each of these infants Mills found that the paralysis was unilateral and accompanied by circulatory changes in the affected limb, mainly in the region of the skin of the buttock, varying from oedema and induration to actual sloughing and ulceration. These babies had all been born in a state of white asphyxia and had all been given at least one injection of nikethamide into the umbilical cord. Labour in each case had been prolonged and difficult, 6 being vertex presentations and 3 delivered by Caesarean section. Seven of these babies had oedema of the buttock, which in 3 cases went on to ulceration. One had ulceration of the skin overlying the front of the tibia. Two of the babies died; of the survivors, 5 showed complete recovery of the nerve lesion, but one still had a complete drop-foot at the age of 2 years.

Mills advanced the hypothesis that the palsy and the induration of the buttock were in each case due to thrombosis of the inferior gluteal (sciatic) artery, which supplies the sciatic nerve and the adjoining skin in the gluteal region. Before birth this artery is the largest branch of the hypogastric (internal iliac) artery and constitutes the main arterial blood supply for the lower limb. After birth, this function is taken over by the external iliac artery. Mills pointed out that if the drug were injected into either of the two umbilical arteries in the umbilical cord, it might be forced into the inferior gluteal artery and its branches, and possibly cause thrombosis, with subsequent ischaemia of the sciatic nerve and the overlying gluteal skin. The flow of blood in the single umbilical vein is, of course, towards the heart. He concluded, in the absence of other evidence, that the lesions in these 8 cases were due to injection of nikethamide into an umbilical artery.

Many doctors, even those with very wide experience, have never seen this syndrome of neonatal sciatic palsy; and most have not even heard of it. It seems incredible that such an obvious clinical finding should have passed unrecognized unless, as Mills suggested, it was indeed a new neonatal syndrome. Bates and Page[2] (1949)

reported a similar case in which nikethamide had been used as an analeptic. Hudson, McCandless and O'Malley[3] (1950) recorded 20 similar cases, which had occurred in two hospitals in Liverpool between 1945 and 1948. The drug injected into the umbilical cord in the Liverpool series of cases was 'cycliton', a synthetic compound having a chemical formula resembling that of nikethamide (coramine). These workers stated that no ill effects had been noticed after the use of lobeline, which is not a synthetic compound. In general, they agreed with the theory of Mills that the lesions were consistent with the injection of a drug into an umbilical artery, with noxious effects on the inferior gluteal artery and the tissues supplied by it.

Fahrni,[4] working in Liverpool, studied 11 of the cases subsequently described by Hudson and his co-workers, and in 1948 submitted his findings for publication in the British Journal of Bone and Joint Surgery, advancing the theory that the lesions might be caused by pressure of a foetal hand on the sciatic nerve and buttock during labour. Fahrni's paper was not published until 1950 and in the meantime further investigations were carried out in the University of Liverpool as to the exact nature of the cause of this syndrome, which tended to support the theory that the cause of the lesions in the sciatic nerve and gluteal skin was the intra-umbilical injection of a drug, and not local pressure, although exact experimental proof is still lacking. In the 20 Liverpool cases there were 17 vertex presentations, 2 breech presentations, and 1 Caesarean section. Six cases showed sloughing of the gluteal skin, and the majority of the 20 cases at the end of 2 years still showed evidence of sciatic-nerve weakness, such as drop-foot, wasting and shortening of the limb.

DISCUSSION

All that the baby seen by us in Germiston seems to have in common with the babies described in England is that he showed asphyxia at birth, had a drug injected into the umbilical cord, and has a palsy of the sciatic nerve. Therefore, it seems to us, in the absence of any contrary evidence, that the hypothesis put forward by Mills adequately explains the causation of the syndrome of neonatal sciatic palsy accompanied by circulatory changes in the affected leg.

The condition seems to be rare and it is obvious that not every infant who has an intra-umbilical injection will get sciatic palsy. As there are two umbilical arteries and only one umbilical vein, it is probable that many injections have been made into an umbilical artery without ill effects, and without doing any good! Not infrequently one sees slightly older children with wasting and slight shortening of one limb, due to no obvious cause. Usually the diagnosis is made, with no real evidence to support it, of 'missed polio'. Do these cases perhaps fall into the category of 'missed neonatal sciatic palsy of mild degree'?

Whether intravenous or other injections of stimulants are successful in resuscitating asphyxiated babies, is debatable. It seems that intra-umbilical injections carry a certain risk and, if they must be done, every effort should be made to inject the drug into the umbilical vein only, since the recovery of sciatic-nerve lesions in infants is poor.

SUMMARY

1. A case of neonatal sciatic palsy in an infant is described.

2. A theory as to the causation of the lesion is discussed.

3. Injection of drugs into the umbilical cord seems to be dangerous.

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VAN DIE REDAKSIE

RUGGRAATSVERKROMMING

Sywaartse kromming van die ruggraat is 'n toestand wat die mediese wetenskap al vir 'n duisend jaar interesseer. 'n Oorsig van die verskillende teorieë oor die oorsaak daarvan sou boekdele vul en 'n studie van die behandeling daarvan sou 'n menigte meganiese toestelle, liggaamshoudings en beheerstelsels in aanmerking moet neem. Ten spyte hiervan is die enigste werklik praktiese vordering in die behandeling geleë in die *stroombelyning* van die bestaande metodes, soos die vervanging van staal deur aluminium, of van swaar leerkruisbande deur 'n ligter plastiese soort.

Sover is daar nog geen geneesmiddels nie en vermoedelik is die vernaamste rede vir hierdie feit die verwarring wat daar bestaan i.v.m. die oorsaak van skoliose. Soos een gesaghebbende oor die onderwerp onlangs geskrywe het, is daar nie eens 'n aantreklike hipotese vir die idiopatiese tipe nie.[1] Vir sommige van die ander tipes kan iets meer presies voorgestel word. So sal bv. eensydige verlamming van die laterale buikspiere as gevolg van anterior rugmurgontsteking (*polio*) 'n vasstaande ruggraatsverkromming veroorsaak, waarvan die konveksheid van die boog (bors-lende-) na die kant van die swak spiere is. Insgelyks sal 'n kort been die bekken laat kantel en 'n kompenserende skoliose veroorsaak wat maklik verhelp kan word deur die hoogte van die hak te stel. Vir die oorgrote meerderheid gevalle met laterale kromming kan daar egter geen oorsaak gevind word nie.

Laterale kromming, so word ons vertel, is een van die boetes vir ons regop houding[2] en enige faktore wat die meganiek van die ruggraat moontlik kan verstoor sal tot kromming predisponeer. Gevolglik word oormatige vermoeienis of swakheid daarvoor verantwoordelik gehou, asook die verkeerde liggaamsposisie wat as 'n gewoonte aangekweek word by 'n swakbeplande skool- of werkbank. Psigologiese faktore word ook aangehaal. Ondanks al hierdie entoesiastiese veronderstellings i.v.m. die oorsaakleer, is baie min bygedra om ons 'n beter begrip van die toestand te gee en slegs in die laaste jare is hierdie gees van ywerige ondersoek op die vraagstuk van prognose sowel as behandeling gespits.

Die prognose is intiem verbonde aan die sogenaamde kurwepatroon. Ponseti en Friedman[3] het 4 kurwepatrone vasgestel wat van die posisie van die boog afhang, nl. bors-, bors-lende-, gekombineerde bors- en lende-, en lendeboog, elk met 'n definitiewe en kenmerkende prognose. Dit is die waardevolste bydrae van die jongste

EDITORIAL

SCOLIOSIS

Lateral curvature of the spine is a condition that has intrigued medical science for a thousand years. A survey of the different theories of its aetiology would fill volumes, and a study of its treatment would involve consideration of a host of mechanical appliances, postures and regimes. Despite this, the only real practical advance in treatment has lain in the streamlining of existing methods, such as the replacement of steel by aluminium, or of heavy leather braces by lighter plastic ones. There is still no cure.

The main reason for this fact, presumably, is the confusion that exists over the aetiology of scoliosis. As one authority on the subject recently wrote, for the idiopathic type there is not even an attractive hypothesis.[1] For some of the other types something a little more definite can be suggested. For example, unilateral paralysis of the lateral abdominal muscles due to anterior poliomyelitis will produce a fixed spinal curvature with the convexity of the curve (thoraco-lumbar) on the side of the weak muscles. Similarly, a short lower limb will tilt the pelvis and produce compensatory scoliosis, which is easily correctable by adjusting the height of the heels. For the vast majority of cases of lateral curvature, however, no cause can be found.

Lateral curvature, so we are told, is one of the penalties of the erect posture,[2] and any factors likely to upset the mechanics of the vertebral column will predispose to it. Thus excessive fatigue or weakness has been incriminated; also the poor posture incurred as a habit by an ill-designed school desk or work bench; and, lastly, psychological factors have been brought into the picture. For all this enthusiastic postulation about the aetiology, little has been contributed to our better understanding of the condition, and only in recent years has this spirit of enthusiastic enquiry been applied to the problem of prognosis and treatment as well.

The prognosis is intimately related to the so-called curve pattern. Ponseti and Friedman [3] have established 4 curve patterns, depending on the level of curvature, viz. thoracic, thoraco-lumbar, combined thoracic and lumbar, and lumbar, each with a definite and characteris-

tyd tot die kennis van die onderwerp. Die prognose is ernstig in slegs omtrent 5-10% van idiopatiese struktuurkrommings en die twee faktore wat in die prognose betrokke is, is (1) die posisie van die kromming, en (2) die aanvangsouderdom. Algemeen gesproke, hoe hoër die vernaamste kromming en hoe vroeër die aanvang, hoe slegter is die prognose. Die teenoorgestelde is ook waar: lendeskoliose is selde ernstig en skoliose wat na die ouderdom van 14 jaar ontwikkel, word dikwels nie erger nie.[4]

Die mees algemene tipe is die gekombineerde bors- en lendekromming, waar die twee boë neig om mekaar te kanselleer en die skouers dus horisontaal en die voorkoms goed is. Dikwels word hierdie gevalle nie opgemerk nie, netsoos die lendetipe (punt van die boog teenoor L 1 of 2) wat 25% van die gevalle uitmaak. Die derde tipe, die bors-lendeboog (punt teenoor T 11 en 12) begin laat en die krommings word groter, gevolglik vereis die uiterlike voorkoms dat dit verhelp moet word. Ten slotte is daar die borskromming (punt teenoor T 8 of 9) wat die swakste prognose het; as dié kondisie voor die ouderdom van 12 jaar begin, is die vooruitsigte baie sleg en is die afwyking altyd groter as in die ander tipes, want die ribbes is betrokke in die rotasie wat met die laterale kromming gepaard gaan.

Hierdie indeling is belangrik want daardeur is dit moontlik om te besluit watter gevalle waarskynlik deur behandeling sal baat. Daar is niks so bedrieglik as om op die oog te skat hoe erg 'n geval van ruggraatsverkromming is nie; en nog meer belangrik—dit word nou aanvaar dat konservatiewe behandeling (oefeninge, gipsomslae, ruggraatstutte) nog nooit 'n struktuurskoliose verbeter het nie. Dit is wel waar dat die kind mag leer om beter te staan en 'n beter uiterlike voorkoms mag hê, maar die graad van verkromming is nooit verbeter nie. Die verskille in die kurwepatrone maak dit nou moontlik om definitief te verklaar dat naasteby 3 uit elke 4 gevalle van skoliose nie ernstig sal word nie, daarom vereis hulle nie behandeling nie en sal hulle ook nie daarby baat vind nie. Natuurlik vereis hierdie 75% voortdurende toesig, maar in hierdie gevalle kan die urelange afwesigheid van die skool, die dra van stutte en die beperking op hul bedrywighede vermy word.

In die 5-10% gevalle wat 'n ernstige gebreklikheid ontwikkel en wat reggemaak moet word, is die prosedure eerstens die vermindering van die hoek van die kromming met 'n *turn-buckle cast* (Risser-omslag); tweedens, samesmelting van die ruggraat, en dan moet die pasiënt in 'n gipsbaadjie lê. Elk van hierdie stadiums kan moontlik 6 maande of langer duur. Nietemin maak hierdie behandeling dit moontlik vir die pasiënt, wat gewoonlik 'n meisie in haar tienderjare is, om die wêreld met groter gelatenheid in die oë te sien, en net ter wille van die voorkoms alleen kan dit geregverdig word.

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tic prognosis. This is the most valuable recent contribution to the study of the subject. Only about 5-10% of idiopathic structural scoliosis is serious in prognosis and the two factors involved in prognosis are (1) the level of curvature and (2) the age of onset. Generally speaking, 'the higher the level of the main curve and the earlier the onset, the worse is the prognosis. The reverse also holds good: lumbar scoliosis is seldom serious, and scoliosis developing after 14 years of age does not often progress'.[4]

The commonest type is the combined thoracic and lumbar curve, where the two curves tend to cancel each other out, and the shoulders are therefore level and the appearance good. Often these cases go undetected, as do the lumbar type (apex at L 1 or 2), which accounts for about 25% of cases. The third type, the thoracolumbar curve (apex at T 11 or 12), commences late and the curves become greater, and therefore begs correction for cosmetic reasons. Finally, there is the thoracic curve (apex at T 8 or 9), which has the worst prognosis; if the condition begins before the age of 12 years the outlook is very poor, and always the departure is greater than in the other types, because the ribs are involved in the rotation which accompanies the lateral curvature.

This classification is important because it makes it possible to decide which cases are likely to benefit by treatment. Visual impression is never more deceptive than in the assessment of the severity of a vertebral curvature; and—more important—it is now recognized that 'conservative treatment (exercises, plasters, spinal supports) never improved a structural scoliosis. It is true that the child might learn to stand better and look a little better, but the degree of curvature never improved'. By means of the curve-pattern distinctions, it is now possible to state definitely that, say, 3 out of every 4 cases of scoliosis will not become severe, and therefore do not require, and will not benefit by, treatment. Naturally this 75% require constant watching, but in these cases long hours away from school, the wearing of supports and the restriction of activities can be avoided.

In the 5-10% of cases that develop a severe deformity and have to be corrected, the procedure is, first, reduction of the angle of curvature by a turn-buckle cast (Risser jacket), and then spinal fusion followed by recumbency in a plaster jacket. Each of these stages is likely to take 6 months or more. However, this treatment enables the patient, who is generally a young girl in her teens, to face the world with greater equanimity, and justification for it can probably be found on cosmetic grounds alone.

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THE CENSORSHIP OF LITERATURE

Censorship of literature is a two-edged weapon which may in the long run do more harm than good. It is also a most difficult function for any individual or committee to exercise. With the limitations, prejudices, fads and foibles which enter into the make-up of most of us, even the most learned, the censor is given the power and duty of restricting the free choice in books and journals of the community as a whole, and declaring that certain literature shall be put outside their reach. There is a warning before us in the way this and analagous powers have been abused in totalitarian states in the endeavour to force the knowledge and opinions of the public into a particular mould. Ludicrous examples, too, of censorship gone wrong are to be found in the most democratic of countries.

This distrust of censorship is generally shared by thinking people. Nevertheless there is a strong general opinion that certain literature, for instance pornographic publications (to refer to only one kind of 'evil' literature), is harmful to the reader, especially the child and adolescent, and should be controlled. Even this kind of censorship calls for much caution in its exercise. Many masterpieces of literature and art could hardly have come into existence if they had been subject to a prudish board of censors.

Sex in literature is of immediate interest to the medical profession not only because of the psychological importance of sex in health and disease, but because much essential medical literature has a pornographic value if it gets into the hands of consciously or unconsciously prurient readers amongst the laiety. The same applies to certain other scientific literature. Another aspect of the subject appears when books are published for pornographic purposes under the guise of medical or scientific literature.

At present a Committee of Inquiry into Undesirable Literature, set up by the Union Government, is taking evidence. Should it be decided to establish an authority with powers to deal with the publication and distribution of 'undesirable literature' it is advisable to devise measures to make the views of the medical profession available to that authority. An obvious way to achieve this would be to give the profession (preferably through the South African Medical Association) representation within the authority or on its appropriate committee. If measures are decided on that do not include the establishment of such an authority, it will still be desirable to maintain contact with the profession. The reason for this is not only to safeguard the freedom of *bona fide* medical literature, but also because the question of harmful literature cannot be adequately dealt with without information about its possible effect on psychical and physical health.

CARCINOMA OF THE BREAST: THE STATUS OF PRESENT THERAPY WITH SPECIAL REFERENCE TO A CASE TREATED BY BILATERAL ADRENALECTOMY AND OOPHORECTOMY

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The treatment of carcinoma of the breast has undergone changes throughout the history of surgery. The Halsted operation has held the field for many years; but even Halsted,[1] in 1898, included clearance of the supraclavicular fossa as part of his radical mastectomy in most cases. Although his followers largely abandoned these refinements, there has been a renewal of these operative extensions, e.g., Andreassen and Dahl-Iversen [2] clear the supraclavicular region; Margottini,[3] Urban [4] and Adair [5] excise the internal mammary group of glands by a block dissection in selected cases. Saunders and Griffin [6] have even suggested that in certain cases a bilateral mastectomy is necessary because their figures indicate that bilateral involvement occurs in 7-10% of patients with breast carcinoma.

On the other hand McWhirter [7] claims better results, in the later cases particularly, with a less extensive (so-called conservative) mastectomy, followed by deep X-ray therapy. His results have supported such procedures, but it has been maintained that indecision resulting from these arguments has led to less well performed operations.

Peters [8] states: 'The McWhirter technique has produced impressive 5-year survival rates. However, from the data presented, whether it be a comparison on the basis of statistical 5-year survival, theoretical principles, or basic fundamentals, the evidence supports radical mastectomy in preference to simple mastectomy together with post-operative radio-therapy in the treatment of operable breast cancer.' He argued that in early carcinoma of the breast there may be axillary metastases, not observable clinically, which cannot be removed by simple mastectomy; reliance must then be on deep X-ray therapy to destroy these cells.

The main doubt is whether deep X-ray therapy can really destroy all carcinoma cells. Reliable clinics employing routine pre-operative radiation followed by radical mastectomy within a period of one year, show microscopic evidence of viable carcinoma cells, not only in the involved axillary nodes, but also in a high

percentage of the primary lesions. This has been proved despite various radiation techniques and the employment of extremely heavy radiation. 'Acceptance of a method leaving cancer cells behind is most unattractive, especially when a method is available affording a reasonable opportunity to eradicate these cells, the growth of which is unpredictable and certainly inevitable'.[8]

'Radical mastectomy is a valuable therapeutic weapon that today is to some degree in disrepute as it has been used indiscriminately, often in patients whose disease is entirely beyond the reach of the surgeon. The disappointing results obtained by the operation done in these circumstances have led surgeons to perform it carelessly. Bad selection is added to bad surgical technique with disastrous consequences to the patient.' This statement by McDonald, Haagensen and Stout [11] is true because it is well known that an operation which cuts through carcinoma cells is a useless surgical measure and actually reduces life by about 10 months.[12]

The argument in favour of the less extensive or the more radical procedure is dissolved if one definitely classifies cases of carcinoma of the breast as operable or not. The stages described by various authors (Table I) have not been uniform.

These methods of staging do not include features such as size of tumour, duration, rate of growth, site, age and histology.

Geschikter [33] points out that a tumour 1—1·5 cm. in diameter, of average duration of 3 months, has metastases in the axillary glands in 25% of cases; and a tumour 5 cm. or more in diameter, which has been present for a year or more, has metastases in the axillary glands in nearly all and involvement of internal viscera in 90% of cases. He estimates that a carcinoma of the breast increases in diameter by 1 cm. in 3 months on the average and correlates the size and duration with the 5-year survival rate (Table II).

TABLE I

	Stage I	*Stage II*	*Stage III*	*Stage IV*
Steinthal [9]	Mass in breast	+ Axillary glands	+ Local metastases	+ Distant metastases.
McWhirter [7]	Mass ± ulceration	+ Axillary glands	+ Fixation to pectoral fascia	Late inoperable cases
Cade [10]	Mobile mass ± attached to skin	+ Axillary glands	+ Skin nodules	+ Generalized spread

TABLE II

Size	*5-year Survival Rate*
Less than 1 cm. in 6 months	84%
1 cm. in 6 months	63·5%
Over 1 cm. in 3 months	18%
Inflammatory (rapid growth)	4%

Richards [31] suggests the following staging (Table III):

TABLE III

Stage	*Description*	*% Survival* 5-year	10 year
I.	Breast mass 1-3 cm. in diameter	81%	59%
II.	Breast mass 3-6 cm. and a few small axillary glands	54%	28%
III.	Skin dimpling or nipple retraction. Mass over 6 cm. in diameter attached to fascia; a few axillary glands	38%	21%
IV.	Skin oedema or ulceration or skin nodules or acute inflammation. Diffuse tumour infiltration or rigid fixation to chest	16%	8%
V.	As above and nodules away from the periphery of the breast. Extensive axillary or supraclavicular nodes and distant metastases	3%	0%

It is unfortunate that most surgeons do not favour formulae in medicine. The 'clinical index of malignancy' in breast carcinoma as formulated by Lee and Stubenbord,[35] and used in conjunction with staging, is of considerable value.

The Clinical Index of Malignancy (C.I.M.) is derived from the formula 1L+2A+3S+4R+5E, as modified by Richards.[34] Points are assigned as follows:

Lactation (L)	Absent—0. Present—9.
Age (A)	Before menopause—1. 4 years or more after menopause—2. Commencement with or up to 4 years after menopause—4.
Site (S)	Outer quadrant, no lymph nodes—½. Inner quadrant, no lymph nodes—2. Outer quadrant, with nodes—3. Inner quadrant, with nodes—5.
Rate of Growth (R)	Slow—1. Moderate—2. Fast—3. Rapid (inflammatory)—4.
Stage or Extent (E)	I—1. II—2. III—3. IV—4. V—5.

A total (by the formula) of 10-30 points indicates that the malignancy is low; 31-40 points indicate intermediate malignancy; and over 40 points indicate a highly malignant and extremely unfavourable condition.

The identification of cases as categorically inoperable seems an essential part of the approach to this problem. Haagensen and Stout [12] a decade ago gave criteria of inoperability based upon careful assessment of the clinical picture. These criteria (almost the same today) may be summarized as follows:

1. When extensive oedema involves more than one-third of the skin over the breast.
2. When satellite nodules are present in the skin over the breast.
3. When the carcinoma is of the inflammatory type.
4. When any 2 or more of the following signs of locally advanced carcinoma are present:
   (*a*) Ulceration of the skin;
   (*b*) Oedema of the skin of limited extent (less than one-third of the skin over the breast);

(c) Fixation of the tumour to the chest wall;
(d) Axillary lymph nodes measuring 2·5 cm. or more in transverse diameter;
(e) Fixation of axillary lymph nodes to the skin or the deep structures of the axilla.

5. When there is oedema of the arm.
6. When, in patients with clinically involved axillary lymph nodes, a supraclavicular dissection reveals metastasis in the supraclavicular lymph nodes.
7. When, in patients with clinically involved axillary lymph nodes, a biopsy of the internal mammary lymph nodes reveals metastases.
8. When X-ray study of the skeleton reveals metastases.
9. When X-ray study of the lungs reveals metastases.
10. When palpation of the liver suggests that it contains metastases.

SUPRACLAVICULAR AND INTERNAL MAMMARY LYMPH NODE METASTASES

The problems of extension to the supraclavicular and the internal mammary groups of lymph nodes are very much to the fore at present.

The Supraclavicular Lymph Nodes

In the Presbyterian Hospital, New York, 21·8% of the patients treated by radical mastectomy between the years 1915 and 1934, and who were found to have axillary metastases, later developed clinical evidence of supraclavicular metastases.[11]

Andreassen and Dahl-Iverson [2] performed 98 dissections and reported that 33·4% of patients who had metastases to the axillary lymph nodes also had occult supraclavicular involvement of lymph nodes.

The subclavicular (apical) lymph node is supplied not only by the well-filtered system from the axilla and from the breast, but also by direct unfiltered lymphatic channels—including the more lateral pathway through Rotter's node (the interpectoral gland).[11] Moreover, the distance between the subclavicular node mentioned and the supraclavicular or 'sentinel' node, situated at the junction of the subclavian and internal jugular veins, is only 2 cm. Extension to the supraclavicular gland makes the case categorically beyond the scope of surgery but 'experience has taught us that, when metastases have reached the subclavicular group of lymph nodes, operation never achieves cure'.[11] In other words, involvement of the apical group of lymph nodes places the patient in this serious category of absolute inoperability.

The Internal Mammary Group

Hanly and Thackray [13] have studied this group of glands. They occur mainly in the first 3 intercostal spaces with another group on each side in the 6th intercostal space. Dahl Iversen and Soerensen [14] in 53 patients who belonged to the operable group (using Haagensen and Stout's classification) found 19% had involvement of the internal mammary gland; when there were metastases of the axillary lymph glands the figure was 47%. Margottini [3] found 5% involvement of the internal mammary glands in stage I carcinoma. When there were axillary glandular metastases, the figure was 27·7%, and when the carcinoma was in the inner quadrant of the breast, as high as 40·5%.

The extensive attack on carcinoma of the breast by more radical procedures has been advocated by Urban [4] and Urban and Baker.[15] Adair [5] states: 'There is no effective substitute for meticulous radical surgery and extension of surgery should include: (1) removal of the nodes in the neck, (2) removal of the clavicle, (3) removal of the nodes along the internal mammary artery, (4) removal of involved ribs, (5) routine removal of the axillary vein, and (6) interscapulothoracic amputation when necessary.' He is strongly against treatment by radiotherapy after simple mastectomy.

Haagensen and Stout [12] perform a routine biopsy of the 2nd intercostal space (for investigation of the internal mammary group of glands) and also a simultaneous biopsy of the supraclavicular region. This has given them a more precise indication for radical surgery. It is of interest that they then perform a radical mastectomy for the operable cases; the others receive only radiotherapy. They summarize: 'It may be justifiable in the light of what we already know, to carry out block dissections of the internal mammary chain in certain types of cases, but this should be done only when the supraclavicular region, as well as the internal mammary region in the 1st intercostal space, has been proved by biopsy to be free of carcinoma. Cases fulfilling these conditions are few. We must not uselessly penalize a large proportion of our patients with this trying disease by subjecting them to indiscriminate internal mammary block dissection that can hope to benefit only a few.'

It is apparent that in a stage-I carcinoma in which there is a mobile mass there is a 5% chance of involvement of the internal mammary chain, and when there are extensions in the axillary lymphatic gland there is a chance of extensions to the internal mammary and supraclacivular lymph glands in one-third to one-half of the cases.

Suggested Staging

It seems more reasonable today to classify cases as follows:

Stage 1: Clinically undiagnosable carcinoma of the breast in which there is a mobile unattached mass, without any extensions, and in which there is no attachment to the skin or suspicion of an inflammatory nature. In this stage a biopsy by wide excision, and naked-eye as well as microscopic examination, confirms the diagnosis. Permission should have been granted before operation to perform a radical mastectomy, which is then proceeded with. If the microscopic appearance shows a very actively growing tumour, there is some justification for removal of the ovaries (either then or later), for it is in this type of patient that it is most likely that the 5% chance of extension to the internal mammary glands has already occurred. Particularly is this so if this type of growth is found in the medial half of the breast.

Stage 2: Early diagnosable carcinoma of the breast. The features present are early tacking to the skin or increased elevation of the affected breast on contraction of the pectoral muscles, with a mass palpable with the flat of the hand. In these cases a biopsy is often done, but is usually not needed. Radical mastectomy is necessary. When the microscopy shows a very actively growing tumour, a bilateral oophorectomy may be performed as well in the pre-menopausal woman. In all stage-1 and stage-2 cases a careful examination of the

axillary tissue must include serial histological sections to determine the presence of involved lymph nodes microscopically, although these may not be evident clinically. If the involved nodes are found, the treatment should be that for stage 3.

Stage 3: Carcinoma of the breast, still operable according to the Haagensen and Stout classification, but excluding the additional procedures of supraclavicular and 2nd-intercostal-space biopsy. When the categorically inoperable features are excluded, there remains the condition of a mass in the breast with ulceration of the skin, limited oedema of the breast, fixation of the tumour to the chest wall, lymph nodes in the axilla measuring 2·5 cm. or less, and fixation of the axillary nodes to the skin or deep structures. These features may occur as single items additional to the mass in the breast. They never occur together in this stage. In nearly half the cases there is the likelihood of extensions to the internal mammary and supraclavicular glands. It is therefore necessary in this group to advise routine oophorectomy as well in pre-menopausal women.

Stage 4: Categorically inoperable carcinoma of the breast. This group includes all types mentioned in Haagensen and Stout's classification. Here it is advisable to perform a simple mastectomy, to follow with deep X-ray therapy and to prepare for bilateral oophorectomy and adrenalectomy.

With the introduction of the concept of hormone-dependent tumours, the value of hormone treatment and oophorectomy, or oophorectomy plus adrenalectomy or hypophysectomy, must be considered in relation to the practical clinical problem.

Permission must always be obtained before operation that, if microscopy shows numerous mitotic figures, oophorectomy may be performed at the same time as mastectomy.

In all cases deep X-ray therapy should follow mastectomy. In the inoperable group there is possibly some advantage in pre-operative deep therapy followed by mastectomy and then bilateral adrenalectomy.

CASE REPORT

The features of this classification are illustrated in the following case report:

A European female aged 51 was seen on 15 December 1951 with a mass in the right breast, diagnosed as a stage-I carcinoma. Radical breast excision and clearance of the axilla was performed on 22 December 1951. The growth consisted of trabeculae of somewhat undifferentiated spheroidal cells. There was much pleomorphism with innumerable mitotic figures. There was a marked fibrous tissue response. The features were those of a carcinoma simplex of the breast of the so-called scirrhous type. Dissection of the breast and axillary contents revealed no further spread or metastatic growth.

She received X-ray therapy post-operatively and convalesced normally except that she continued to complain of hot flushes, present before the operation.

In December 1952 she began to complain of low back pain. X-rays revealed an extensive lesion of the 12th dorsal vertebra due to secondary deposits. X-ray therapy was given with some relief, but the pain returned and in June 1953 pain was continuous in the back, extending around the waist on the right side and down as far as the right calf. The menses ceased at this time. In June and July 1953, 1,000 mg. of Testosterone were administered by injection with alleviation of pain. Oral Testosterone was continued in smaller doses until September 1953, when there was very little pain but hypertrichosis, coarsening of the skin, seborrhoea and deepening of the voice were pronounced. Heberden's nodes appeared in the fingers and Testosterone was discontinued. X-rays revealed new areas of infiltration in the pelvis, femoral heads and trochanters. X-ray therapy was applied to the affected areas. Intramuscular injections of Testosterone were resumed in October 1953 and the dosage gradually increased from 300 mg. to 750 mg. weekly. This therapy was continued until the pre-operative stage of her illness.

During the next 6 months she carried on normal household activities, appeared vigorous, although complaining of pain in the neck and shoulder, and in March 1954 complained of very severe pain in the left chest, restricting her breathing. X-rays revealed extensive deposits by secondary growth in the 4th, 7th, 9th and 10th ribs on the left side. X-ray therapy was resumed to these areas. Irgapyrin was given by injection and later Butazolidin orally, with apparent palliation. At this stage (March 1954) treatment was supplemented by oral administration of cortisone acetate, 100 mg. a day. This resulted in a better appetite and a feeling of well-being. In May and June 1954 she developed severe pain in the head, neck and shoulders and burning back pain. She found herself forced to lie down and rest most of the day; even talking was painful. X-rays in June 1954 showed multiple osteolytic metastases in the skull, cervical, dorsal and lumbar spine and pathological fracture of the 4th lumbar vertebra. There were secondaries in the scapulae, ribs and pelvis. No deposits were seen in the lungs. A persistent metallic taste which developed was bitterly complained of and led to the omission of cortisone by 22 June. Largactil and Pethidine were given for pain with no relief.

Bilateral adrenalectomy and oophorectomy were advised and accepted. Within a few days the patient was admitted to hospital in severe pain, vomiting food and fluids and unable to talk except in a whisper. She was unable to move her head, to sit up or turn. Examination showed no skin nodules, a normal left breast, no enlarged lymphatic glands, no enlargement of the liver and no physical signs in the lungs or heart. Blood pressure: 130/80 mm. Hg. Pre-operative and post-operative substitution treatment was carried out according to the method used by Pyrah and Smiddy,[16] slightly modified.

Day before operation: Cortisone acetate, 50 mg. 6-hourly (intramuscular); Doca 5 mg. (intramuscular); sodium chloride 3 g. by mouth.

Day of operation: Cortisone acetate, 150 mg. 1 hour before operation and 50 mg. 4-hourly intramuscularly; Doca 5 mg. intramuscularly.

First post-operative day: Cortisone 50 mg. 6-hourly intramuscularly; Doca 5 mg. intramuscularly; sodium chloride 3 g. by mouth.

Days 2-6 *post-operative:* Cortisone 50 mg. 12-hourly by mouth; Doca 3 mg. intramuscularly; sodium chloride 3 g. by mouth.

After the 6th day: Cortisone 25 mg. 12-hourly; sodium chloride in excess of normal use.

Laboratory investigations carried out on admission (6 July) 1954 were as follows:

Full blood-count: Haemoglobin 18·3 gm.%. Red cells 6,260,000 per c.mm. Leucocytes 13,700 per c.mm. Polymorphonuclears 83%, with a shift to the left.

Serum calcium: 12·5 mg. per 100 c.c. (normal range 9-11 mg. per 100 c.c.).

Urinary sodium: 100 mg. per 100 c.c. (normal 670 mg. per 100 c.c.).

Urinary calcium: 14·3 mg. per 100 c.c. (normal 13 mg. per 100 c.c.).

Serum sodium: 315 mg. per 100 c.c. (normal range 325-350 mg. per 100 c.c.).

Total serum protein: 6 gm.% Serum albumin 3 gm.%; globulin 3 gm.%.

Blood alkaline phosphatase: 5·8 King-Armstrong units (normal 5-10).

Serum phosphorus: 3 mg. per 100 c.c. (normal range 2-4 mg. per 100 c.c.).

Blood urea: 80 mg. per 100 c.c.

Catheter urine: Contained no albumin, no sugar and scanty epithelial cells. There were numerous bacteria and a profuse growth of coliform bacilli was obtained on culture.

Intravenous fluid dextrose and saline were administered together with vitamins B and C. Vomiting ceased in 48 hours and

she ate normally. Gantrisin was given for the bacilluria and on 16 July the blood urea was 75 mg. per 100 c.c., urine culture showing only scanty organisms at this time.

Operation was performed on 19 July 1954. Hibernation anaesthesia was employed and the patient was placed flat on her back; through a mid-line lower abdominal incision the ovaries were removed.

The patient was then turned on her left side, the table depressed at the head and the feet, and the incision was marked out in a line from the umbilicus to the 10th thoracic spine, passing over the 12th rib, which was outlined. The incision was then made, passing from the lateral border of the rectus to about 4 inches from the 10th spine. The abdominal muscles were incised and the peritoneum separated from them and from the under surface of the 12th rib and diaphragm. The 12th rib was dissected free and disarticulated. The pleural reflection was visualized passing across the 12th rib and carefully preserved. The diaphragm was retracted superiorly and the peritoneum mobilized forward from the kidney. Through the peritoneum the liver and the portal vein could be seen. Posteriorly the kidney and its covering fascia (Gerota's fascia) were seen.

The adrenal gland, situated superior and medial to the kidney, was recognized by its yellow colour. After gentle dissection medial to the kidney, the inferior vena cava could be seen with the short branch of the adrenal vein passing to the gland. The removal of the gland was done by ligation of the vessels passing to the gland by means of an aneurysm needle, freeing the gland first medially and then superiorly and laterally. Finally the attachments through Gerota's fascia to the kidney were divided.

Haemostasis is not difficult if a gentle technique with ligation is used rather than artery forceps. Closure of the muscles in layers and skin suture were done without drainage.

The patient was then turned on the right side and the incision marked out in the same manner as before, the operative procedures being repeated on that side. The structures are slightly higher and the only difference is the sight of the spleen through the peritoneum instead of the liver.

There was no evidence of shock.

Microscopy of the ovaries and the adrenals did not reveal any pathology.

The decision about a 1-stage or 2-stage operation on the adrenals depends on the condition of the patient and whether the pleura has been left intact on the first side. It is a wise precaution to do only the one side if the pleura on that side is opened. Suturing of the thin pleura is always precarious and, in moving of the patient, it is easy to injure the suture line, resulting in an opening between the pleural and abdominal cavities with collapse of the lung. Moving the patient at the end of the bilateral operation, when the pleura has been opened, is always a hazard.

Post-operative Course. This was uneventful until the 30th day. For the first 2 days the patient was drowsy (owing to the hibernation anaesthesia) but in good condition and gave no cause for concern at any time. The blood pressure was maintained between 110 and 130 mm. Hg systolic without the use of Levophed.

The patient afterwards stated that during this period she felt herself struggling to live. These sensations were not apparent to us. On the 3rd day she stated that her pains were relieved. On the 31st post-operative day she suffered a bereavement. A close friend (who had lived with her for many years) died in her home. She developed vomiting and acute circulatory collapse with acute adrenal insufficiency after a period of severe emotional reaction with crying and exhaustion. The systolic blood-pressure fell to 80 mm. Hg. She responded rapidly, however, to intravenous saline and intramuscular cortisone, 100 mg. 6-hourly. On the 64th post-operative day there was an acute pain in the chest on the left side, with fever. There was diminished air-entry on the left side, with dullness but no haemoptysis. No phlebitis was apparent and the pain subsided in 4 days.

Progress has been satisfactory since then and there has been little or no pain. She requires no medication other than hydrocortone 20 mg. twice daily by mouth and goes about her usual household duties. She travels to town by bus when necessary.

Laboratory investigations carried out after operation were as follows:

Serum calcium, 20 July: 9·9 mg. per 100 c.c.

Blood urea, 22 July: 68 mg. per 100 c.c.; 11 August: 40 mg. per 100 c.c.

Serum sodium, 22 July: 315 mg. per 100 c.c.; 18 August: 320 mg. per 100 c.c.

Serum potassium, 22 August: 18 mg. per 100 c.c.

Urinary sodium, 22 July: 50 mg. per 100 c.c.

Urinary calcium, 29 July: 12·6 mg. per 100 c.c.

Blood alkaline phosphatase, 2 August: 29·2 King-Armstrong units.

X-ray examination on 18 November 1954 showed a very marked improvement in all the secondary deposits with recalcification. The secondary deposits were very much smaller in all lesions (Figs. 1-4). Dr. H. I. Osler reported as follows on the radiographs taken in August and November 1954:

Pelvis. A very marked improvement is seen in the deposits in the pelvic bones, and in the deposit in the right wing of the sacrum. The secondary deposits are smaller, and are recalcifying.

Lumbar Spine. The main comparisons (between the 12th dorsal and the 4th lumbar vertebral bodies) show a similar improvement. The 4th lumbar vertebral body is consolidating and recalcifying, and shows some deformity from compression. The 12th dorsal shows a slight irregularity of trabeculation, with no evidence of any compression.

Cervical Spine: The vertebral bodies show deformity, and the neck is rather short and thick, but no evidence of any active deposits can be demonstrated.

Skull: A very marked improvement in the secondary deposits is demonstrated. They are smaller and are recalcifying, and no radiological evidence of intracranial pressure is seen.

There is a very marked improvement in all the secondary deposits, with recalcification; the secondary deposits are very much smaller in all the lesions.

DISCUSSION

Modern endocrine therapy of breast cancer is based on research associating oestrogens with the development of breast carcinoma in experimental animals. This knowledge we owe to the work of Loeb,[17] Murray [18] and Lacassagne.[19]

Out of this arose the concept of hormone-dependent tumours,[20] including cancers of the breast in men and women. Hadfield [20] gives an excellent review of the subject of so-called hormone-dependent carcinomata. The rationale of the hormone treatment of carcinoma is considered as well as the different problems before and after the menopause. He describes the spontaneous carcinoma which arises in hybrid mice, develops during pregnancy and disappears when the pregnancy is over, but is re-activated with further pregnancy. He points out that the small terminal ductules of the breast are the cells particularly sensitive to oestrogen.

Endometrial studies of women in the post-menopausal period show that 30% continue to produce endogenous oestrogen. This is confirmed by vaginal smears. The probable source of these oestrogens is the adrenal cortex. Nevertheless, prolongation of life by hormone treatment must be assessed against a background of the natural history of untreated mammary carcinoma. Gordon-Taylor [21] reports an average duration of survival, untreated, of 25·4 months in the cellular type and 5½ years in the scirrhous type, with an over-all average of 3½ years. Riddell[2] reported that the average natural duration of life of the untreated breast carcinoma was 3¼ years. Loeser [23] and Adair and Herman [24] treated breast cancer with testosterone and found regression of the primary tumour as well as of osseous secondary deposits. Raven,[25] treating breast cancer and osseous metastases with methyl testosterone, has described survival in 2 cases for periods respectively of 6 and 7

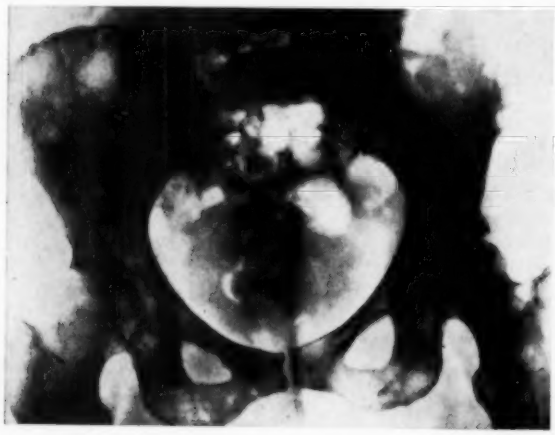

Fig. 1. X-ray of pelvis on 6 July 1954.

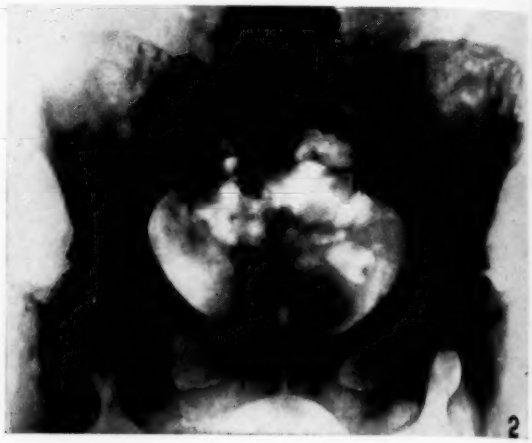

Fig. 2. X-ray of pelvis on 16 November 1954.

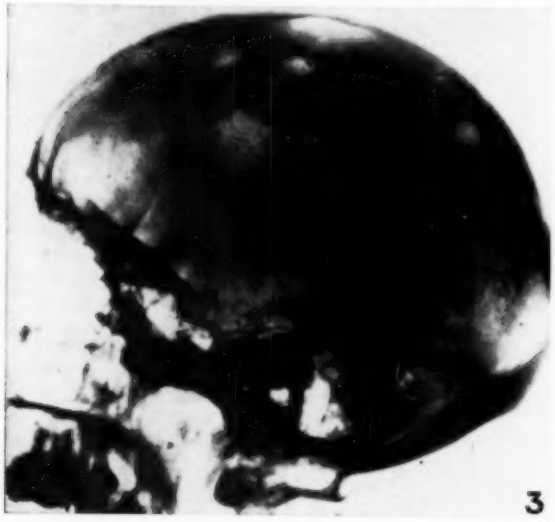

Fig. 3. X-ray of skull on 20 September 1954.

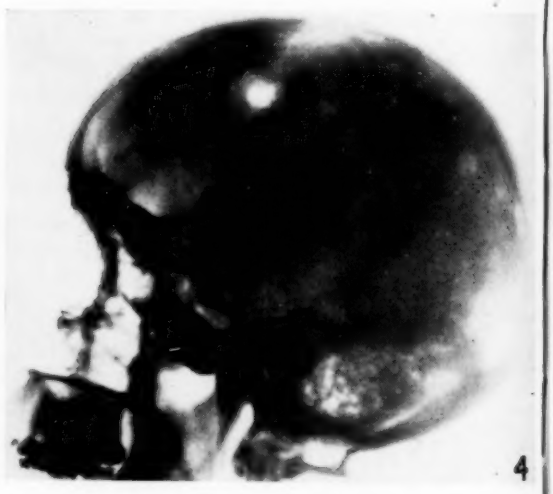

Fig. 4. X-ray of skull on 16 November 1954.

years after commencing therapy. Apparently some of these patients are sensitive to variation of their sex-hormone balance, for regression of the disease may be achieved by the administration of oestrogen or androgen, and by oophorectomy or adrenalectomy or both operations combined. Possibly gonadal hormones act by depressing excessive production of pituitary tropins, such as may occur after the menopause.

However, it is advisable not to administer oestrogen to pre-menopausal women, for breast cancer may be stimulated. Its use should be restricted to patients well past the menopause. Such treatment should be combined with X-ray therapy. Androgens may be used in the younger age-group. The primary growth, soft-tissue lesions, and glandular, osseous and other metastases, may all regress, even to the point of complete healing. Oestrogens have a greater effect on soft-tissue lesions and androgens on bony metastases.

Oophorectomy leading to clinical improvement in breast cancer was first recorded by Beatson [26] in 1896, and Lett [27] in 1905 collected 99 such cases. In 23% of these there was much improvement. The operation has been re-introduced in recent years. X-ray irradiation of the ovaries has also been used. Raven [25] reported a case of breast carcinoma with cervical and lymph-node metastases alive and well with no signs of cancer 5½ years after oophorectomy.

Huggins and Dao,[28] acting on the assumption that renewed growth of hormone-dependent tumours after oophorectomy is due to the elaboration of steroids by the adrenal cortex, were able to induce a further regression in cases of human mammary and prostatic

cancer by performing bilateral adrenalectomy and maintaining the patient on cortisone acetate. They reported on 55 cases, including 2 men and 53 women, with mammary carcinoma treated by adrenalectomy. Fifty of these cases are reviewed; 25 patients aged 44-70 years had adrenalectomy alone and 25 patients aged 29-59 years had oophorectomy with bilateral adrenalectomy. Ten patients in each group, with regression and metastases in bones and pleura, showed the best results, with recalcification of osteolytic secondaries and disappearance of intrathoracic deposits on X-ray.

Cade [29] reported 46 adrenalectomies in 1954 for breast cancer and assessed the results as 23·7% with remarkable, dramatic and in many ways surprising improvement; 31·6% showed satisfactory improvement, with relief of pain not quite complete and new lesions appearing while existing ones faded away; 28·9% showed no subjective or objective improvement.

On the assumption that oestrogenic activity of the adrenal gland is due to pituitary tropin, Luft and Olivecrona [30] performed hypophysectomy in 9 cases with 'huge recurrences' after mastectomy in breast cancer. In one case where removal was complete, as shown by tests of pituitary function, healing of the enormous, ulcerated, cancer surface occurred in 8 months and the biopsy examinations at intervals showed gradual disappearance of carcinoma cells, just as has been noted in cases treated by adrenalectomy. Five cases are too recent for assessment, and in 2 cases with no improvement tests showed functioning pituitary tissue. One case died 3 months after removal of the pituitary without improvement. They consider the operation in these cases to be comparatively free of danger and well tolerated.

Perrault [31] describes improvement 2 years after hypophysectomy for cancer of the breast with metastases. He mentions the ease of correction of thyroid and adrenal cortical deficiency after operation but warns against the too ready use of cortisone, which may reactivate hypophyseal tissue left behind at operation.

The case reported here is of interest because of the severity of the clinical symptoms. She was bedridden and riddled with osseous metastases. The high blood-urea may have been due to the hypercalcaemia causing renal damage. Nephrocalcinosis was considered but no evidence of this was seen on X-ray.

In spite of this, bilateral oophorectomy and adrenalectomy were performed in one stage, with relief of pain in 72 hours, recovery of the patient to a state of normal activity up to the time of writing, and recent radiological evidence of healing of osseous metastases, 4½ months after the operation.

Attention is drawn to an acute Addisonian crisis which resulted from a severe emotional upset during convalescence, and was readily corrected by increasing the dosage of cortisone. Hydrocortone substitution therapy has been shown not to be associated with disturbance in taste in her case.

Hypocalcaemia and hypercalcuria pre-operatively were considered to be due to bone destruction from osteolytic bone deposits.[32] Reversal of this post-operatively was taken to indicate cessation of the activity of the cancer deposits. Increased blood alkaline phosphatase post-operatively was an index of improvement indicating osteoblastic activity and healing.

The virilizing effect of androgen therapy has now disappeared.

The microscopic appearance of the primary growth (an undifferentiated carcinoma) did not encourage us to expect so favourable a response. Huggins and Dao[28] and Pyrah and Smiddy [16] agree that tumours with an alveolar structure respond most favourably to adrenalectomy.

SUMMARY

1. The orthodox surgical treatment of breast cancer is reviewed critically and a new method of staging is described, significant in deciding on surgical endocrine procedures, e.g. oophorectomy with or without adrenalectomy.

2. A case of breast carcinoma with osseous metastases improving dramatically with healing of bone lesions after bilateral oophorectomy and adrenalectomy is described.

3. The primary growth was an undifferentiated carcinoma, a type regarded by some authors as less amenable to this form of treatment.

4. The progress and rationale of endocrine therapy is discussed and reference is made to hypophysectomy in the treatment of breast carcinoma.

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EXPERIENCES IN RESECTION FOR PULMONARY TUBERCULOSIS IN THE SOUTH AFRICAN NON-EUROPEAN

A REVIEW OF 203 CONSECUTIVE CASES

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Although the literature abounds with reports on resection for pulmonary tuberculosis, a series on South African non-Europeans has not been described.

This is a review of the cases resected during the period January 1949 to June 1953, with a follow-up of 1—5 years. There were 90 Bantus, 77 Asiatics and 36 Coloured patients; of these 113 were males and 90 females.

The 5-year period has been one of changing concepts and the analysis will indicate this.

Prospective surgical cases, after full investigation, are presented at a weekly meeting of the hospital staff and visiting surgeons. The discussions are led by the medical superintendent. In the cases accepted for operation the resection to be performed is also decided on. If, as occasionally happens, unsuspected lesions are found at thoracotomy, the surgeon uses his discretion as to the type of operation necessary.

Indications. The indications for extirpative operations have followed the general trend as found in the literature.[1–5] Whereas resections were performed in 1949 and 1950 for gross disease only, cases with less extensive lesions were submitted to surgery in 1951, 1952 and 1953 in the form of segmental resections (Table I). Taking

TABLE I

Year	*Pneumonectomies*	*Lobectomies*	*Lobectomies and Segmental Resections*	*Segmental Resections*
1949	4	3	1	*Nil*
1950	13	17	1	*Nil*
1951	12	18	3	4
1952	19	39	9	16
1953, to June ..	11	14	4	15
Total ..	59	91	18	35

into account only the most prominent indication for operation in each case, the following totals illustrate the frequency of the different indications. Ninety-four operations were performed for cavitatory tuberculosis, 43 for tuberculous bronchiectasis, 36 for destroyed lobes or lungs, 28 for minimal lesions and 4 for failed thoracoplasties.

Investigations. Before cases are assessed for surgery, the following investigations are carried out:

1. A full clinical examination and revaluation of the patient. This includes a re-check on all the laboratory investigations.
2. Bilateral bronchography.
3. Bilateral tomography.
4. A recent bronchoscopic examination.

The E.N.T. consultant and the dentist then have to pass the patient as fit for major surgery. A clinical evaluation of the respiratory function of the patient, and an electrocardiographic examination, are performed shortly before the operation.

Pre-operative Treatment

All the cases in this review have received anti-tuberculous drugs, but the dosage, the type of antibiotic and the period of pre-operative administration have varied considerably. Thus in 1949 antibiotic treatment consisted of 1 g. of streptomycin daily, and 12 g. of PAS per day for a relatively short period before and after the operation. Then, during 1950 and up to June 1951, there was no fixed scheme of antibiotic treatment. Every new admission was individually assessed as to the antibiotic therapy required. So some patients had streptomycin daily for 42 days, while others had streptomycin and PAS daily in short courses; but 10 days before the operation all cases started with daily streptomycin and PAS and completed a period of 42 days of continuous antibiotic treatment. By June 1951 the regime became standardized and 1 g. of streptomycin was administered every 3rd day, with daily PAS, and continued for an extended period. When isoniazid was introduced during 1952 it was used to cover the period of the operation, but by May 1953 most cases had received isoniazid for several months, combined with streptomycin and PAS given for periods varying from 6 to 24 months as pre-operative treatment.

Phrenic crush and pneumoperitoneum were methods of treatment employed before 1951. Since then they have been abandoned.

As far as the general condition of the patient is concerned, we try to rectify any abnormality and eliminate all concomitant infections and parasites. Pre-operative and post-operative physiotherapy is carried out with attention to posture and controlled respiration by the hospital physiotherapist. The routine use of penicillin and 'broad-spectrum' antibiotics has been stopped and they are only administered when indicated and according to sensitivity tests.

The Operation

The resections are carried out in the face-down position by the generally accepted ligation technique.

All blood lost during and after the operation is replaced by blood transfusion. For this purpose we prefer a cut down on a forearm vein, rather than the ankle, because it has been our experience that the rate of flow is better in this position and that post-operative thrombosis of the vein is less frequent. This arrangement is also more convenient for the anaesthetist. The loss of blood is estimated by weighing the swabs, after the

method described by Cole and Longhead.[6] To this is added the amount in the suction bottle.

For anaesthesia the closed-circuit CO_2-absorption method is employed. Relaxants are used. At present pentothal and scoline are used for induction, followed by laudolissin or flaxedil, pethidine, and gas and oxygen.

Post-operative Treatment

Two water-sealed drainage tubes are always inserted for lobectomies and segmental resections. After extrapleural pneumonectomies where excessive oozing may be anticipated a tube is inserted as well. In these pneumonectomy cases we clamp the tube and release it at regular intervals for a short while. Suction is used for all segmental resections, so as to keep a continuous negative pressure in the chest and remove all accumulated air.

The patient is nursed in the resuscitation room of the theatre until he is conscious and has a stable blood-pressure.

In cases of post-operative shock levophed, methedrine and eucortone have been used with benefit, although adequate replacement of blood remains the basis of treatment of shock.

After lobectomies and segmental resections 10 c.c. of a 10% solution of sodium iodide is given intravenously daily or even twice daily for about a week, to decrease the viscosity of the sputum, as described by Baker *et al.*[7] With this form of treatment the number of cases of post-operative ateletasis decreased and those that occured seldom required bronchoscopy. The present antibiotic regime following resection is as follows: Daily 400 mg. of isoniazid, 8—12 g. of PAS, and 2 g. of streptomycin for 14 days. Then 1 g. of streptomycin daily is administered for a fortnight more. Finally we carry on with 1 g. of streptomycin every 3rd day.

The patients included in this review were, if no complications occurred, kept in hospital for 4—6 months after the operation. During the last 2 months of their stay in hospital they attended the rehabilitation centre run by the South African Red Cross, where they were taught different crafts. Thus a graduated return to normal activity was obtained.

Today patients are discharged earlier, but receive active treatment for a much longer period than before at clinics.

ANALYSIS OF RESULTS

Surgical statistics will vary directly with the type of risk the medical and surgical staffs, working as a team, are willing to accept for surgery. Usually surgery is an elective procedure, but we have operated on cases as a last resort and as a life-saving measure, and the general tendency has always been to apply surgery to destroyed lungs and persistently positive cases. Table II is aimed at giving a concise reflection of the results obtained.

Deaths

The deaths are subdivided into 2 groups: (*a*) those that occurred within the first 60 days following a resection and (*b*) those that happened later. Deaths that were not related to the operation or to tuberculosis have nevertheless been included.

There were 22 deaths in all. Fourteen occured early and 8 were late deaths.

The Early Post-operative Deaths

1. (1949) Coloured female. Left pneumonectomy for failed thoracoplasty. Died of bronchopneumonia 4 days after the operation.
2. (1950) Indian male. Left upper lobectomy following a left 7-rib thoracoplasty. Died of congestive cardiac failure 20 days after resection.
3. (1950) Indian male. Left extrapleural pneumonectomy for a destroyed lung. Died of peripheral circulatory failure 5 hours after the operation.
4. (1950) Native male. Right upper lobectomy for cavitatory tuberculosis. A tension pneumothorax subsequent to a burst bronchus caused his sudden death on the 4th day after the operation.
5. (1950) Indian male. Right extrapleural pneumonectomy for a destroyed lung. Died on the 4th post-operative day of strangulation of part of the liver through a tear in the diaphragm.
6. (1950) Native male. Left upper lobectomy for cavitatory tuberculosis. Succumbed to acute pulmonary oedema and atelectasis of the left lower lobe on the day after operation.
7. (1950) Native male. Right upper lobectomy and resection of apical segment of right lower lobe for cavitatory tuberculosis. Died of amoebic dysentery 10 days following the operation.
8. (1950) Coloured male. Left upper lobectomy and concomitant 5-rib thoracoplasty for haemoptyses from a destroyed lobe. Fatal pulmonary embolus on the 10th post-operative day.
9. (1951) Indian male. Left extrapleural pneumonectomy combined with a 6-rib thoracoplasty for a destroyed lung. Died of surgical shock the night of the operation.
10. (1951) Native female child. Left lower lobectomy for tuberculosis bronchiectasis. Sudden cardiac arrest during operation.
11. (1951) Native female. Left upper lobectomy for cavitatory tuberculosis. Died 12 hours after the operation of massive pulmonary oedema and acute cardiac failure.
12. (1952) Adolescent Native female. Left extrapleural pneumonectomy for a destroyed lung. A very difficult resection with sudden cardiac arrest.
13. (1952) Native male. Left extrapleural pneumonectomy for a destroyed lung associated with a tuberculous empyema. Died of haemorrhage and shock 4 hours after the operation.
14. (1952) Native female. Left upper lobectomy for a destroyed lobe. Sudden cardiac arrest during the operation.

The Late Post-operative Deaths

1. (1950) Indian male. Right upper lobectomy for a destroyed lobe. Thoracoplasty for a complicating broncho-pleural fistula

TABLE II

Year	*Total*	*Quiescent*	*Active*	*Unknown*	*Deaths before 60 days*	*Deaths after 60 days*	*Operative Mortality*	*Total Mortality*
1949	8	4	1	2	1	*Nil*	12·5%	12·5%
1950	31	16	1	2	7	5	22·6%	39 %
1951	37	28	2	3	3	1	8·1%	10 %
1952	83	72	1	6	3	1	3·7%	4·7%
1953, to June	44	41	*Nil*	2	*Nil*	1	*Nil*	2·2%
Total	203	161	5	15	14	8	7 %	11 %

and empyema. Died 8 months after the resection of a persistent fistula and empyema.

2. (1950) Indian male. Left upper lobectomy and decortication of lower lobe for cavitatory tuberculosis. Thoracoplasty for bronchopleural fistula and empyema. Died of an intrathoracic haemorrhage 2 years after the original operation.

3. (1950) Native male. Right upper lobectomy for cavitatory tuberculosis. Death due to constrictive pericarditis 5 months after the operation.

4. (1950) Coloured female. Left pneumonectomy for a destroyed lung. Died 3 years later of a non-specific pneumonia. No evidence of active tuberculosis found.

5. (1950) Native female. Left extrapleural pneumonectomy with a simultaneous rib-thoracoplasty. Died of a reactivation of the disease in the remaining lung 3 years later. Unfortunately this patient did not return for further treatment after the recrudescence of the tuberculosis.

6. (1951) Coloured male. Right pneumonectomy for cavitatory tuberculosis. Broncho-pleural fistula and empyema followed. Death due to sudden intrathoracic bleeding 4 months after.

7. (1952) Native male. Right pneumonectomy for cavitatory tuberculosis. An empyema followed but this was healed by a thoracoplasty. Died of paralytic ileus 4 months after the operation.

8. (1953) Native female. Left extrapleural pneumonectomy for a destroyed lung. A broncho-pleural fistula and empyema followed. Died of broncho-pneumonia 6 days after the thoracoplasty which, 6 months after the original operation, was performed to close the space.

Complications

The complications that occurred after the various forms of resection are shown in Table III. There were 18 broncho-pleural fistulas with empyema. Although

TABLE III

Complications	*Pneumonectomy*	*Lobectomy*	*Lobectomy and Segmental Resection*	*Segmental Resection*
Broncho-pleural fistula and empyema	5	11	1	1
Empyema	6	1	*Nil*	1
Spreads	4	7	*Nil*	*Nil*
Bronchial-stump infections	2	2	*Nil*	*Nil*
Blindness in one eye	1	*Nil*	*Nil*	*Nil*
Paralysis of vocal cord	*Nil*	1	*Nil*	*Nil*

this is a very formidable complication only 4 of these patients died. Two patients have small persistent sinus tracks, even after extensive thoracoplasty. They are however 'negative' and able to work.

Seven of the 8 cases of empyema are quiescent and working after extensive thoracoplasty operations to obliterate the space. The 8th patient is still receiving active antibiotic treatment.

There were 11 cases of post-operative reactivation or spread of the disease. One patient did not return for treatment and died at home. Five became quiescent after further prolonged antibiotic treatment and have been discharged. Two cases are still showing signs of resolution of the disease with general improvement, and 3 are not responding to treatment, probably because the organism is by now insensitive to the known antibiotics. The 4 bronchial-stump infections mentioned in the table cleared up on further antibiotic treatment and are asymptomatic.

We have not enumerated the cases of immediate post-operative atelectasis because this condition is as a rule transient and responds to intravenous sodium iodide or bronchoscopic aspiration. There is, however, one case with a permanently collapsed left lower lobe after a left upper lobectomy combined with a limited thoracoplasty, performed as one operation. This patient, however, has remained 'negative' and asymptomatic and has refused further surgery. He attends clinic regularly.

One patient, who had a pneumonectomy, was found to have a total ophthalmoplegia and blindness of the right eye on recovering consciousness. The eye muscles recovered completely about 3 days after the operation, but the blindness has been permanent.

Follow-up

Many ex-patients attend clinics regularly, but the follow-up of the remainder has been difficult. This is due to their wide dispersal, the great distance of some from a clinic, frequent change of abode, and low standard of education. Some have returned to kraals with little contact with the outside world. Nevertheless, of the 181 patients presumed living we have been able to trace 166. Of these, 129 have received repeated and recent follow-up examinations at the Durban Chest Clinic and found to be fit and well with no evidence of disease. There were 25 patients who were unable to report locally for final examinations, but we have had medical reports about them from their local doctors. About 12 patients we have had no recent medical reports, but they have reported themselves as feeling fit and are working.

Five cases out of the 166 traced have active disease. Four are still receiving treatment in hospital and one is working, while being treated at the Durban Chest Clinic.

Ten patients can be classified as respiratory cripples and and are in sheltered employment. Of these, 6 had pneumonectomies.

COMMENT

It has been indicated how the types of resection varied year by year. There has been an impressive improvement in results. Whereas the operative mortality for the whole series is 7%, that for the first 2 years under review was 20.5% and for the next 2½ years only 3.7%. In our view this is due to:

1. The improved condition of the patient pre-operatively.
2. The introduction, and more discriminate use, of antibiotics to combat tuberculosis.
3. The wide range of 'broad-spectrum' antibiotics now available and their judicious use according to sensitivity tests.
4. The improvement, with experience, of the surgical team.
5. The more accurate estimation of the loss of blood at operation.
6. The prolonging of the patients' stay in the anaesthetic recovery room.
7. The relative increase in segmental resections.

Except for a short period after the introduction of isoniazid, no drugs have been withheld for the specific

purpose of saving them to tide the patient over the operation.

Our approach to thoracoplasty as a procedure either before or after a resection has been conditioned by the fact that the non-European patient does not readily consent to this operation. He is averse to thoracoplasty because he feels that it will greatly reduce his chances of subsequent employment.

In cases of extreme mediastinal displacement we do however insist on a thoracoplasty before resecting. After resections thoracoplasties are considered in cases of marked mediastinal shift, in complications (bronchopleural fistula and empyema), and to obliterate dead-space after lobectomy or segmental resection.

We have noted with interest the findings of John Friend [8] and Kergin and Coulthard,[9] that over-expansion is not necessarily deleterious to pulmonary function, or to quiescent foci in the remaining lung-tissue.

Our investigations have shown that the duration of the disease has had no significant bearing on the end results.

In the present state of our knowledge, patients are advised to continue with at least 2 antibiotics for a more or less indefinite period under the control of a tuberculosis clinic.

Since the period under review there has been a tendency to revert to a more conservative approach to resection and as a result the number of segmental resections has decreased considerably. The majority of cases operated on at present are those that are left with gross destruction of lung tissue after they have had the full benefit of anti-tuberculous drugs.

SUMMARY

A review of 203 cases of resection for pulmonary tuberculosis in the South African non-European (Bantu, Indian and Coloured), is presented. The operations performed were as follows:

1. Pneumonectomies—59 cases with 6 early and 5 late deaths.

2. Lobectomies—91 cases with 7 early and 3 late deaths.

3. Combined lobectomy and segmental resection—18 cases with 1 early death.

4. Segmental resections—35 cases with no deaths.

The pre-operative preparation, the post-operative care and the complications have been outlined.

A follow-up of 166 of these cases over a period of 1—5 years is recorded.

We wish to thank the Medical Superintendent (Dr. B. A. Dormer) and Dr. P. Smit for encouragement and helpful advice.

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REVISION SERIES

XI. THE WATERING EYE

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In the practice of ophthalmology one of the most common complaints is that the eyes water, one of the rarest that the patient is unable to weep.

During the waking hours there is a constant flow of tears from the lacrymal gland. This secretion is distributed evenly over the cornea by the act of blinking, and ensures adequate lubrication to maintain the high polish on the surface of the eye, and serves as a protection against the constant impingement of foreign particles and infected matter. Normally very little secretion finds its way through the canaliculi to the lacrymal sac and thence into the naso-lacrymal duct, evaporation keeping pace with secretion, yet any impairment of function of the drainage channels does cause a watering eye; this condition is called epiphora.

Clearly, then, in investigating a weeping eye it is necessary to establish whether one is dealing with a case of lacrymation or of epiphora. Though at times this may be difficult, and on occasion the conditions occur together, the great majority of cases can be assessed correctly without recourse to the more specialized procedures, the techniques of which lie in the domain of the ophthalmologist.

First, it can be emphasized that when the complaint of watering is the presenting symptom—when the patient has come for help because the eye is watering—then epiphora is the likely cause. Contrariwise, where the complaint of watering appears secondary and is associated with other ocular symptoms, lacrymation may be suspected. Of the two, epiphora is by far the more

disturbing, is more persistent and is excited by different, usually physical, stimuli.

EPIPHORA

Epiphora then is more exactly the condition indicated under the heading 'the watering eye', and will be considered first.

The causes of blockage, either partial or complete, of the lacrymal passages vary with age, sex and social habits. Thus acute dacryocystitis with consequent blockage is a common disease in the middle age-groups seen in hospital out-patients, though relatively uncommon in private practice. The chronically obstructed naso-lacrymal duct is a disease of women more often than of men owing, in all probability, to the fact that in women the bony canal is narrower. Ectropion with its misplaced lacrymal puncta occurs in the elderly.

Congenital

However, the first to be met, and this is common, is the baby with one or both lacrymal ducts imperforate. The complaint is that from birth, or within two or three weeks of birth, either one or both eyes have watered—indeed the onset of the epiphora is coincident with the commencement of the secretion of tears, for it will be remembered that a newborn baby does not weep; it may bawl, howl and grow red in the face, but tears do not flow for the first two or three weeks of its life. As a rule, and unless secondary infection has occurred, there is no real pus, but a certain amount of sticky mucus at the inner canthus of the eye; the conjunctiva is not red or injected as in conjunctivitis, and this observation together with the history is sufficient to establish the diagnosis without further ado.

In some cases the overflow of tears is caused by cellular debris still present in the very recently canalized naso-lacrymal duct, and often enough these cases cure themselves if one allows time for them to do so; all that is required is that the eye be kept clean and the parents reassured, though this last may be far from easy. Other cases are due to the lower end of the duct where it opens into the inferior meatus of the nose at the valve of Hasner being imperforate. These cases have to be probed. Unfortunately there is no way of telling which of these conditions is present in a given case, but as a rule it does no harm to wait a few weeks to see whether, with conservative treatment, cure will take place, before submitting the infant to an anaesthetic for the purpose of probing the duct.

Nevertheless it is a mistake to delay overlong, and it is a fair rule that if the tears are not draining freely by the age of 5 months a probing operation should be done; it is a simple procedure, once the technique has been learned, and almost always successful.

Congenital absence of lacrymal puncta is rare. I can recall only 2 cases in my recent experience; one is the child of a colleague whom I examined for possible refractive error. She had no suggestion of epiphora and her father was delighted to point out the anomaly which I had not noted. The other, seen in out-patients' department, a child of the same age and sex, has an eye which waters continually, and of course a chronic conjunctivitis from the perpetual rubbing. An artificial opening direct from inner canthus into sac may help but only if a high state of cleanliness is maintained, and this is almost too much to expect.

Dacryocystitis

The next common cause of epiphora is infection in or around the lacrymal sac; it may be acute or chronic.

The acute sac presents with all the signs of inflammation, the centre of which is, of course, over the lacrymal sac; the diagnosis and treatment form no part of this paper, but it is worth mentioning, in passing, that an acute sac points below the medial palpebral ligament and not above it. Once there has been an acute infection of the sac, however, it is likely that fibrosis of the outlet occurs and so blockage of this narrow passage; thus chronic dacryocystitis with regurgitation of muco-pus through the puncta on pressure over the sac, is a certain and frequent cause of watering.

All sorts of organisms have been isolated from lacrymal-sac secretion. Pneumococcus has been found to be a frequent inhabitant, but any of the common pathogens may be present, not excluding bacillus coli. Isolation of the organism is therefore worth while if conservative treatment is to be attempted.

In children one must remember that both tubercle and syphilis, by attacking the underlying bone, can be causative.

A mucocele of the sac is not uncommon, and more often than not there is no history of acute inflammation; it presents as a swelling about the size of a split pea which can be reduced by pressure, when the mucoid material passes back along the canaliculus into the conjunctival sac or, more rarely, can be squirted down the naso-lacrymal duct into the nose.

Treatment of the chronic lacrymal sac is in the first place by repeated, but gentle, probing and filling the sac cavity with a solution chosen to attack the offending organism, if this has been isolated. If this procedure fails, and more often than not it does, either a dacryocystectomy or dacryo-cysto-rhinostomy operation is required.

Neoplasm, which may cause watering by blocking the passage anywhere in its course has to be remembered, as in all other differential diagnoses, but it is fortunately rare.

Malposition of Puncta

Next to be considered is epiphora associated with malposition of the lacrymal puncta; in practice only the lower punctum need be considered.

The puncta drain fluid from the surface of the eyeball by capillary action, and in order that this mechanism should function efficiently they must be in exact apposition to the globe. Eversion of the lid margin, therefore, which displaces the punctum so that a space exists between it and the bulbar conjunctiva, is bound to cause epiphora. This eversion, when slight in extent, is easily missed, and it is useful to note that under normal circumstances, when the patient looks upward, it is just not possible to see the punctum of the lower lid without pulling the lid away a little with the finger; if it can be seen without this manoeuvre it is out of position.

Again, the fibres of the orbicularis muscle have a compressing action on the lacrymal sac so that, in blinking or squeezing the eyelids, fluid in the sac is forced down the naso-lacrymal duct while, on release of the pressure, fluid is drawn through the canaliculi into the sac. If, therefore, there is a weakness of this muscle, as in facial palsy, two things may happen to cause epiphora —the lid may sag bringing the punctum away from contact with the eye, and the pumping action on the lacrymal sac may become inefficient.

With this mechanism of tear drainage from the conjunctiva in mind, it is a simple matter to understand how disease such as chronic blepharitis, dermatitis of the lid, or trauma which interrupts the continuity of the lid margin, can bring about a weeping eye, and how this, aided by the continued wiping of the eye and chronic irritation, leads eventually to the unsightly and distressing ectropion with 'lacrymal conjunctivitis', hypertrophic changes in the mucosa, and maceration of the lower lid, so commonly seen in elderly folk; and this despite the fact that the lacrymal passages are patent, as can be shown by the use of a simple syringe.

Treatment of course depends upon the cause. In all cases it is essential to establish that the passage is clear, and the best and simplest way of doing this is by dilating the punctum and syringing gently, when fluid should pass easily, and be felt by the patient in the naso-pharynx. Thereafter efforts are directed to the establishment of adequate drainage by surgical means. It may be necessary only to remove the inner wall of the punctum (the first vertical millimetre of the canaliculus) so that the opening again comes into contact with the globe, or carry out a considerable plastic operation to lift and invert the lower lid in order to regain correct apposition.

Trauma

Trauma to the inner quarter of the lower lid is frequently seen and deserves special mention. Often the canaliculus is cut and, if it is left unattended, or the lid margins simply sutured, epiphora is a certain result. These cases require painstaking surgery: a silver wire is inserted into the lacrymal punctum, passed through the cut canaliculus and down the naso-lacrymal duct to appear at the nostril. Over this is passed a narrow polythene tube and the wire removed; the two ends of the tube are strapped to the cheek; and finally the cut canaliculus is sutured round the tube. The tube is left *in situ* for about 3 weeks. This procedure is usually successful in allowing the canaliculus to heal without fibrosis and blockage of the lumen; it is an exasperating little operation and requires the patience of Job.

Summary

Only the commoner conditions leading to epiphora have been mentioned, but the knowledge of the mechanism of tear disposal will suggest other possibilities and their mode of correction.

To summarize then, there are 3 main causes of epiphora:

1. The punctum so misplaced or abnormal that tears do not enter the canaliculus.

2. The passages, canaliculus, sac, or naso-lacrymal duct, obstructed by atresia, inflammation, neoplasm, trauma or foreign body.

3. An obstruction at the inferior meatus of the nose.

LACRYMATION

Excessive lacrymation is not as common as epiphora. It often occurs intermittently, when it gives rise to social and cosmetic embarrassment. The etiology is varied and complicated:

(*a*) Primary lacrymation, due to direct disturbance of the lacrymal glands, is rare. The syndrome of Mikulicz comes to mind, and it may be an early sign in the rare cases of tumour or cyst of the gland.

(*b*) Psychic lacrymation, of central origin, can sometimes become pathological but requires no elucidation here.

(*c*) Neurogenic lacrymation is the reflex weeping brought about by irritation of nerve endings which, often by most devious and ill understood pathways, connect with the gland. Of these reflex trigeminal irritation is by far the most important. Almost any affection of the eye or conjunctiva leads to lacrymation, but irritation of any branch of the fifth nerve can excite it.

Eye-strain and excessive accommodative effort are a potent cause of lacrymation and seem also to sensitize the eyes to bright light, so that the bilateral watering of reflex visual irritation becomes excessive. However, stimuli affecting any one of the cranial nerves, other than XI and XII, have been responsible for lacrymation, as is exemplified by the rare syndrome of 'crocodile tears'; here, after a lesion of the geniculate ganglion, weeping on the paralysed side accompanies the eating of food, more particularly if this is appetizing. The explanation envisages that some regenerated nerve-fibres have gone astray and entered the wrong nerve-sheath. Again, weeping accompanying chewing, a less rare anomaly, may be due to a pathological process involving the temporo-mandibular joint, the reflex excitation occuring *via* the auriculo-temporal nerve.

All this is fascinating, perhaps more so than the rather prosaic study of epiphora, but its clinical import is slight compared with that of the latter, and in most cases the symptom is secondary.

Symptomatic lacrymation has been noted in the course of some general diseases. In tabes it forms an important feature of the ophthalmic crises occurring usually in the pre-ataxic stage—presumably a central lesion. Thyrotoxicosis may, for mechanical reasons, cause weeping, but its advent before the appearance of exophthalmos indicates that this is not the sole cause.

Treatment, as always, depends on the cause. Excessive eye-strain or a chronic irritative conjunctivitis or even keratitis may require careful examination before it can be diagnosed; irritation in the nose, polyps, a deviated septum, etc., need to be excluded.

When no cause is found, and this is not very uncommon, attempts can be made to reduce the output of the lacrymal gland. Extirpation of the palpebral lobe of the gland can be carried out or, though I have not found this to effect more than a temporary cure, either

alcohol injection into the gland or cauterization of the ducts which empty into the conjunctival fornix at the upper outer angle. The risk of extirpation is, of course, a dry eye, and this is so much worse than a wet one that the procedure is only rarely undertaken.

The conservative treatment, which is surprisingly useful in mild cases, is the application of astringent drops; zinc sulphate is the usual choice, and together with adrenaline is one of the most widely used and satisfactory medicaments in the oculist's armamentarium.

THE CANCER CAMPAIGN IN AMERICA

SUMMARY OF REPORT ON A VISIT TO THE UNITED STATES

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Maraisburg

Dr. Charles Berman has recently visited the U.S.A. to attend the Fifth International Conference of Geographic Pathology, where he had been invited to contribute a paper on *primary liver cancer*.

This conference, with two others, viz. the International Congress of Clinical Pathology and the International Meeting of the Association of Medical Museums, was sponsored by WHO. The three conferences were held simultaneously, but separately (except for two plenary sessions), in the Shoreham Hotel, Washington, and lasted one week. There was a combined attendance of 1,400 doctors from all parts of the world.

The Geographic Pathology congress dealt with cancer of 5 organs, viz. the stomach, liver, lung, heart and uterus. Four principal 'reporters' read papers on *primary liver cancer* based on the results of a questionnaire on that form of the disease answered in various parts of the world. Dr. Berman, one of the four, submitted a paper on *Nutritional States in the Causation of Primary Carcinoma of the Liver*.[1] The other 3 reporters were Dr. P. F. Denoix, of Paris (*Geographic Distribution*), Prof. F. C. Roulet, of Basle (*Pathological Anatomy*), and Dr. J. Higginson, of Johannesburg, whose subject was *The relation of carcinoma of the liver to cirrhosis malaria, syphilis and parasitic disease*. There were several other speakers, of whom one, Prof. Pao-Chang Hou dealt with the relationship between the fluke *Clonorchis sinensis* and primary liver cancer, the commonest form of malignant tumour found among in-patients at Queen Mary Hospital, Hong-Kong.

In a joint scientific session attended by 1,200 doctors, papers were presented on several subjects other than cancer, including one by Dr. Berman on *Onyalai: an acute form of idiopathic thrombocytopenic purpura affecting African races*.[2]

INSTITUTES IN WASHINGTON

In Washington Dr. Berman visited:

(1) *The Armed Forces Institute of Pathology*, with its huge medical photgraphic department, its great medical library, and its equally famous medical museum.

(2) *The National Institutes of Health*, which comprise 7 institutes under one control and in close proximity engaged in research on cancer, microbiology, mental health, dentistry, arthritis and metabolic disorders, and neurological diseases, including blindness. They are served by the new Clinical Centre, which is a hospital of 500 beds with twice as much space for laboratories as for patients, and devoted exclusively to research, patients being admitted for that purpose only.

(3) *The Armed Forces Institute of Pathology*. This remarkable institute, located in the grounds of the Walter Reed Army Medical Centre, is an 8-storey building specially designed to resist attacks by atomic bombs. It is built of heavy reinforced concrete, most of it is devoid of windows (the rooms being artificially lighted and air-conditioned), and 3 of the storeys are underground. There are many other special provisions in case of atomic attack, including reserve electric and water supply and remote-control blast doors. By means of colour television there is direct auditory and visual communication with the operating theatres in the hospital, as well as pneumatic transport for specimens; the surgeon in the theatre will be enabled to make direct observations, gross or histological, of a specimen in the laboratory and discuss it with the pathologist there.

GORDON CANCER RESEARCH CONFERENCE

This was held by the American Association for the Advancement of Science at New London, N.H. and was the last of 24 weekly conferences embracing many branches of science. It was designed to bring together scientists in related fields (80 attended), and to stimulate cancer research in universities, research foundations, and industrial laboratories. Dr. Berman was one of the 5 invited speakers, each from a different part of the world. His subject was primary liver cancer, with special reference to the Bantu. Many aspects of the cancer problem were discussed by these and other speakers.

CONFERENCE ON EXPERIMENTAL HEPATOMAS

This was held at Harriman, N.Y., and was attended by 75 scientists. Dr. Berman[3] was invited by the National Cancer Institute, under whose auspices the conference was called. Papers were presented by many American workers on the general histophysiology and histopathology of the liver, the genetics of spontaneous liver tumours, and various aspects of experimental hepato-carcinogenesis.

PITTSBURGH

Here Dr. Berman spent several weeks as visiting professor of pathology, through the generosity of the University of Pittsburgh, and was enabled to study the scheme for the education of medical undergraduates in the problem of cancer under the U.S. Government's subsidization plan. He also attended the 3-day *Annual Meeting and Training School of the Pennsylvania Division of the American Cancer Society* at Pittsburgh. One branch of this division (the Alleghany County Cancer Unit) raised $286,000 during 1954.

At the Medical School, which is at present being rebuilt at considerable cost, the programme of cancer teaching (coordinators Drs. D. W. Clare and H. Bisel) is incorporated into the courses taught by the departments of surgery, pathology, medicine, radiology and gynaecology. Tumour clinics are held at (1) the Presbyterian Hospital (the general hospital), which also maintains the Tumour Register, (2) the Falk Clinic (which is the out-patient department of the Presbyterian Hospital, the Women's Hospital, and the Eye and Ear Hospital—all 3 hospitals under one roof—(3) the Children's Hospital, and (4)—for gynaecological cancers only—the Magee Hospital. At these clinics representatives of the various departments cooperate with the cancer coordinators in the treatment and follow-up of cases and in the teaching programme.

MEMORIAL CANCER CENTRE, NEW YORK

This centre, closely connected with the neighbouring Cornell University Medical College, is composed of 4 contiguous cancer institutions, viz. the Memorial Hospital (for private patients), the James Ewing Hospital (a public hospital for other patients), the Strang Cancer Prevention (Detection) Centre, and the Sloan-Kettering Institute for Cancer Research.

In his visits to the *hospitals* Dr. Berman was particularly impressed by the resuscitation ward, where after operation all surgical cases are kept under observation for at least 36 hours under a specially trained medical and nursing staff, with a resident surgeon living in rooms adjoining the ward.

At the *Strang Prevention Centre* women over 35 years old and men over 45 are encouraged to attend for routine examination for the early detection of cancer. The clinical examination includes the skin, superficial lymph nodes, passages and organs of respiration, neck and thyroid, breasts, abdomen and genitalia; digital

examination of rectum and prostate, pelvic examination and vaginal-cervical smears. The laboratory examination includes a complete blood count, urinalysis, stool tests for blood, and Papanicolaou of vaginal-cervical smears. X-rays of the lungs and stomach, and proctosigmoidoscopy, are performed. Should suspicious lesions be encountered they are biopsied if accessible. Annually 24,000 smears and biopsies are examined.

The *Sloan-Kettering Research Institute* is, *inter alia*, pursuing investigations into chemotherapy for cancer. Thousands of chemicals have been tested on transplantable tumours in animals, but only a few have shown promise in the treatment of human cancer, and their effect to date is not curative but only temporarily restraining, and that only in certain cancers. Except for cancer of the prostate and certain sex organs, which respond to sex hormones, epithelial malignancies are almost all unaffected. Nevertheless cancer chemotherapy is making significant contributions towards the comfort of many cases with widespread malignant disease. The chemotherapeutic agents in use include aminopterin, methopterin (folic acid antagonists); 6-mercaptopurine, 6-chloropurine, 6-thioguanine, nitrogen mustard (purine antagonists); triethylene melamine, triethylene phosphoramide, triethylene thiophosphoramide (ethylenimines), urethane, myleran; and oestrogen, androgen, ACTH, cortisone (hormones).

AMERICAN CANCER SOCIETY

Dr. Berman also attended the annual meeting of this society, which was held in New York and lasted a week. It comprised 2 sections, for the medical profession and lay delegates respectively, and a combined meeting for both at which the early detection of carcinoma of the cervix by the Papanicolaou method was discussed, and also tobacco smoking in relation to the etiology of lung cancer. Refresher courses were held on a number of subjects of interest to the cancer campaign.

Dr. Berman's account of the work of the American Cancer Society will be published in a later issue.

CONCLUSION

A profound interest in cancer is displayed in the U.S.A., both in professional and lay circles, the latter chiefly owing to the propaganda of the American Cancer Society. The cancer death rate has steadily mounted despite the introduction of chemotherapy, radio-active isotopes, and unprecedented advances in surgery and radiotherapy. A nation-wide movement, led by the Society, has arisen to further (1) early diagnosis at cancer detection centres or in doctors' surgeries (the Five Point scheme) and (2) basic research. Never before have research workers shown such effort and determination. There seems to be little difficulty in obtaining the necessary funds.

A great interest is being taken in liver tumour, which can easily be induced in experimental animals, and a great deal of research has been conducted into primary liver cancer. However, Dr. Berman found a great deal of confusion in the minds of certain investigators on the nature of some of the induced liver tumours, of which the histological appearances differed radically from human cancers as seen in the African Bantu. This may be due to the rarity of primary liver cancer in the western world. Dr. Berman is more than ever convinced that research into primary liver cancer offers greater opportunities if carried out in Africa.

REFERENCES

1. Berman, C. (1955): Report to the Fifth International Conference of Geographic Pathology. Washington: (In the Press.)
2. *Idem* (1955): Amer. J. Clin. Path. (In the Press.)
3. *Idem* (1955): Remarks on the Human Implications of the Experimental Hepatomas. J. Nat. Cancer Inst. (In the Press.)

QUESTIONS ANSWERED

MUSCLE RELAXANTS AND HAEMORRHAGE FROM OPERATIONAL WOUNDS

Q. Can you supply an answer to the question whether the muscle relaxants, especially 'Flaxedil' and 'Scoline' (succinyl choline), lead to increased haemorrhage and oozing of blood from operational wounds? If so, by what mechanism, and if not, why not?

As an anaesthetist I have had many an argument with surgeons, especially E.N.T. men, concerning this problem. They aver that the use of a little succinyl choline ('Scoline') for the purpose of endotracheal intubation in tonsillectomies causes more 'oozing' from the tonsil bed than would have been the case without 'Scoline'. General surgeons, too, sometimes allege that 'Flaxedil' (gallinine triethiodide) produces increased bleeding from operative wounds. I fail to see how this can occur.

A. As far as can be determined there has been no systematic study undertaken in order to decide whether there is in fact increased bleeding when relaxants are used during anaesthesia. This is the more remarkable because such an impression is widespread amongst surgeons and anaesthetists.

Curare itself has no influence upon the coagulability of the blood. However, when curare or other relaxants are used there is frequently a release of histamine which leads to capillary dilatation. Curare itself, in larger doses, is reputed to cause capillary dilatation directly, and the fall in blood pressure so often noted clinically is supposed to be due to this action. The techniques with relaxants always introduce the possibility of hypoxia and hypercarbia and both of these states lead to capillary dilatation and increased venous pressure. Indeed the presence of petechial haemorrhages is considered indicative of an asphyxial death when noted at autopsy.

In order to mitigate the effects of the respiratory paresis due to the relaxant, intermittent positive pressure methods of assisted or controlled respiration are resorted to and this automatically leads to increased venous pressure. Moreover, techniques involving endotracheal intubation with little anaesthesia and much relaxant stimulate the cough reflex, in turn increasing venous pressure. Finally, intrinsic muscle tone and the massaging action of muscles is important in returning blood to the right side of the heart and if muscle tone is lost through curarization there will be a degree of passive congestion developed especially at the periphery. It is well known guardsmen may faint on parade from the pooling of blood in their lower limbs when they stand too long in perfect immobility.

The balance of probability seems to be in favour of increased venous bleeding in anaesthetized patients who are given a relaxant. There would be little profit in denying the validity of observations made by surgeons in England and the U.S.A. as well as by South African surgeons, but the final answer must rest on a carefully conducted statistical study of blood loss during operations under various anaesthetic techniques.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

The Stellar Filter of the Paterson Engineering Company Ltd., of Windsor House, Kingsway, London, and P.O. Box 435, Johannesburg, has been specially developed for medical and laboratory use where a very fine filtration is required.

It is extensively employed in the production of fine chemicals, insulin, liver and similar animal extracts and other injection solutions which must be free from suspended matter.

The filter consists essentially of a cylindrical shell and outlet manifold constructed to take Stellar patented wire-wound elements or candles, which are fine strainers and are employed as the foundation for a deposited filter bed of filtering powder, known as 'Stellafilt', which may be Kieselguhr graded for the particular purpose or an admixture of Kieselguhr with other materials.

The element consists of a tube with equally spaced longitudinal ribs having a screw thread cut along the entire length, providing on each rib a series of grooves in which the consecutive turns of wire wound on the ribs are firmly located. The openings over the whole area of the element are of regular size and the result is a rigid element with the shortest possible flow and the minimum gap, and the regularity of the openings is designed to ensure an even

coating of filter aid with no break which would permit unfiltered liquid to by-pass.

As regards materials of construction, filter shells for general purposes with aqueous liquids are made of mild steel and lined when necessary with a hard plastic enamel. For foodstuffs and corrosive conditions, stainless steel is used. The filter elements for water, oils and non-corrosive liquids are made with extruded brass tubular cores, electro-tinned and wound with either Monel or stainless steel wire. Where it is imperative that the residual liquid should be conserved, special arrangements are made according to requirements—siphon-type elements, a reversible filter on trunnions, or a separate small filter for dealing with the contents of the main filter.

The filtration of liquids containing other than a small amount of suspended matter is usually facilitated by the use of filter aid as a continuous addition throughout filtration. This addition of filter aid inhibits the formation of a skin of dirt on the pre-coat and by the deposition of further porous material continuously maintains an open filter bed throughout the run. The Stellar Jet Filtraider enables this filter aid to be introduced proportionately into the stream of liquid immediately before the filter and the abrasive diatomite does not pass through the pump.

PASSING EVENTS : IN DIE VERBYGAAN

Medical Congress, Pretoria. Members who have not yet sent notice to the Organizing Secretaries of their intention to attend the Congress (17-22 October 1955) are requested to do so. A form for this purpose is printed in this issue in the advertisement columns (page xxiv) for completion; this may be cut out and posted to the Hon. Organizing Secretaries, Room 28, Administrative Building, General Hospital, Pretoria.

* * *

Dr. A. W. S. Sichel, Chairman, Federal Council, Medical Association of South Africa, has been unanimously elected by the Representative Body as Vice-President of the British Medical Association. This was on the recommendation (reported in the *Journal* of 30 April 1955) of the Council of the B.M.A. in recognition of the valuable services rendered by Dr. Sichel, and the assiduity and success with which he carried out his duties as President of the British Medical Association.

* * *

Dr. L. v. R. Oosthuysen, M.D., M. Med. (*Cape Town*), formerly of Cape Town, has moved to 114 Park Drive, Port Elizabeth, where he has commenced practice as a consulting physician.

* * *

The new factory of Messrs. Smith and Nephew (Pty.) Ltd., makers of Elastoplast Adhesive Bandages and Gypsona Plaster of Paris Bandages will be opened at Pinetown, Natal, on 1 July by Mr. F. M. Medhurst, M.B.E., Chairman of the company in England, in the presence of the Mayor of Pinetown, Councillor G. Dainty. With the new factory in operation only such raw materials as are unobtainable in South Africa will be imported. For the rest it will be a purely South African centre of production.

* * *

Dr. Percy Helman, F.R.C.S. (*Eng.*), who recently returned from England, where for over 4 years he held full-time posts as Surgical Registrar at the Royal Cancer, Metropolitan and Hammersmith Postgraduate Hospitals, London, has commenced Specialist Surgical practice at 915 Groote Kerk Building, Adderley Street, Cape Town. Telephones: Rooms 2-9169; Residence 4-2891.

* * *

The Medical Library of the Medical School, University of Cape Town, announces that the Accessions List of recent additions to the Library is now complete. Members of the Medical Association who desire a copy should apply to the Librarian.

* * *

Dr. J. C. Coetzee, of 17 Church Square, Cape Town was admitted to the Fellowship of the Royal College of Obstetricians and Gynaecologists (F.R.C.O.G.) on 21 May 1955. Dr. Coetzee is at present Chairman of the Cape Town Group of the South African Society of Obstetricians and Gynaecologists.

CONGRESS NEWSLETTER : KONGRESNUUSBRIEF

To all Members of the Association:

The Organizing Committee of the 40th South African Medical Congress, Pretoria, is pleased to announce that, in addition to other attractions, three very eminent members of the medical profession from overseas will be attending Congress to address the Plenary Sessions and, in some instances, combined sectional meetings. They are: Mr. H. J. B. Atkins, Director of the Surgical Department, Guy's Hospital, Prof. Alexander Haddow of the Chester Beatty Research Institute, Royal Cancer Hospital, London, and Dr. Ralston Paterson, Director of the Christie Hospital and Holt Radium Institute, Manchester.

Prof. Bryan McFarland who is an eminent orthopaedic surgeon at Liverpool, Dr. Vera Walker Smith and Mr. John Charnley of the University of Manchester will also be attending Congress.

As has already been announced, the Plenary Sessions will both be devoted to Cancer, and the contributions which will be made by these overseas speakers will be of singular interest to doctors.

Arrangements are in train for a visit to the Game Reserve from Saturday 22 to Monday 24 October, and members are requested to indicate whether they wish to be included on this organized tour as only a very limited number of people can be accommodated. The Reserve will be specially opened for this visit, which promises to be very successful.

In addition to the Golf Trophies which are normally awarded at Congress, it has been decided to hold a Bowls Tournament on Thursday afternoon, 20 October. All interested must please get in touch with the Organizing Secretaries, as only a limited number

Aan alle Lede van die Vereniging:

Die Organiserende Komitee van die 40ste Mediese Kongres kan met genoeë aankondig dat, behalwe die gewone aantreklikhede, drie baie beroemde lede van die oorsese mediese beroep die Kongres sal bywoon om die hoofvergaderings toe te spreek en in sommige gevalle ook die gesamentlike plaaslike vergaderings. Hulle is: dr. H. J. B. Atkins, Direkteur van die Chirurgiese Afdeling, Guy-hospitaal, prof. Alexander Haddow van die Chester Beatty-navorsingsinstituut, Royal Cancer-hospitaal, Londen, en dr. Ralston Paterson, Direkteur van die Christie-hospitaal en die Holt Radium-instituut te Manchester.

Prof. Bryan McFarland, bekende ortopediese chirurg van Liverpool, dr. Vera Walker Smith en dr. John Charnley van die Universiteit Manchester, sal ook die Kongres vereer met hul teenwoordigheid.

Soos alreeds bekend gemaak, sal die hoofvergaderings gewy word aan Kanker, en die bydrae van die oorsese sprekers sal van die uiterste belang wees vir die dokters.

Die nodige reëlings word getref vir 'n besoek aan die Wildtuin wat sal duur vanaf Saterdag 22 tot Maandag 24 Oktober. Daar alleenlik 'n beperkte aantal persone ingesluit kan word by hierdie georganiseerde uitstappie, moet lede vroegtydig te kenne gee of hulle wil meedoen al dan nie.

Die Wildtuin sal spesiaal vir die voorgenome besoek oop wees. Dit sal ongetwyfeld baie suksesvol wees.

Daar is ook besluit om behalwe die gholftrofië wat normaalweg gedurende die Kongres aangebied word, 'n rolbalwedstryd te hou op die middag van 20 Oktober. Alle belangstellendes moet asseblief so gou moontlik in verbinding tree met die Organiserende

of players will be able to take part and greens have to be booked well in advance.

Although the response to the intention cards which were sent out some time ago has been fairly good, it must again be stressed that accommodation in Pretoria will be limited and late entries may find that they are unable to get hotel bookings.

C. M. Grundlingh and W. Waks
Hon. Organizing Secretaries

Sekretarisse, daar die inskrywings beperk sal wees en die bane betyds bespreek sal moet word.

Alhoewel 'n groot aantal lede reeds te kenne gegee het dat hulle die Kongres sal bywoon, word lede weer daaraan herinner dat inwoning in Pretoria baie beperk sal wees, en lede wat nie betyds voorsorg maak nie, mag vind dat hulle geen besprekings by hotelle kan kry nie.

C. M. Grundlingh en W. Waks
Organiserende Sekretarisse

POLIOMYELITIS IN THE UNION

Following are the returns supplied by the Union Department of Health, of cases notified under the Public Health Act as suffering from Poliomyelitis in the period 19-25 May 1955.

	European	*Non-European*
Cape Province:		
Stellenbosch Divisional Council ..		1
Caledon Municipality	1	
Divisional Council Cape Town ..	1	1
Caledon Divisional Council	1	2
Total for Cape Province	3	4
Transvaal:		
Zeerust		1
Benoni		1
Ermelo		1
Total for Transvaal		3
Natal:		
Durban	1	
Warner Beach	1	
Malvern	1	
Cavendish		1
Chakas Kraal Lower Tugela District ..		1
Total for Natal	3	2
TOTAL FOR THE UNION ..	**6**	**9**

Union Department of Health Bulletin. Report for the 7 days ended 25 May 1955.

Plague: Nil.

Smallpox: Johannesburg (Transvaal): One (1) Native case imported from Bechuanaland Protectorate on 21 April 1955.

Typhus Fever, Cape Province: No further cases have been reported from the Glen Grey Magisterial district since the notification of 28 April 1955. This area is now regarded as free from infection.

Epidemic Diseases in Other Countries:

Plague: Nil.

Cholera in Calcutta (India); Chalna, Chittagong, Dacca (Pakistan).

Smallpox in Moulmein, Rangoon (Burma); Phnom-Penh (Cambodia); Ahmedabad, Allahabad, Bombay, Delhi, Kanpur, Kozhikode, Lucknow, Madras, Nagpur, Tellicherry (India); Dacca, Karachi, Lahore (Pakistan); Phanthiet, Saigon-Cholon (Viêt-Nam); Tanga (Tanganyika).

Typhus Fever in Kabul (Afghanistan).

BOOK REVIEWS : BOEKRESENSIES

MEDICAL TREATMENT

Handbook of Medical Treatment. Fourth Edition. Edited by Milton J. Chatton, A.B., M.D., Sheldon Margen, M.A., M.D. and Henry D. Brainerd, A.B., M.D. Pp. 569. $3.00. California: Lange Medical Publications. 1954.

Contents: 1. General Aspects of Medical Treatment. 2. Fluid and Electrolyte Therapy and Parenteral Feeding. 3. General Symptomatic Treatment. 4. Dietetics and Nutrition. 5. Diseases of the Skin. 6. Diseases of the Respiratory System. 7. Diseases of the Heart. 8. Diseases of the Blood Vessels. 9. Diseases of the Blood and Lymphatic Systems. 10. Diseases of the Gastro-intestinal System. 11. Diseases of the Urinary System. 12. Diseases of the Musculoskeletal System. 13. Diseases of the Nervous System. 14. Metabolic and Endocrine Diseases. 15. Hormones and Hormone-like Agents. 16. Neoplastic Diseases. 17. Venereal Diseases. 18. Infectious Diseases. 19. Chemotherapeutic Agents. 20. Diseases of Unknown Etiology. 21. Diseases due to Physicial Agents. 22. Diseases due to Toxins. Appendix: Rehabilitation of the Hemiplegic. Index.

Within the short period of only 5 years this book now appears in its 4th edition, a fact which tends to show its general and sustained usefulness as a pocket *vade mecum* to the general medical public. A glance through the list of contents, and more so the booklet itself, will tend to show how nearly impossible it appears to give a fitting review of it.

The aim of this booklet of some 570 pages is 'to make available a handbook summarizing present-day methods of medical management'. This end certainly seems to have been very nearly achieved within the compass of such a small volume. It is not a synopsis, but it is very concise in its statement of facts: *treatment* throughout receives full emphasis; symptoms and signs and prognosis also are given where possible and necessary. These are welcome additions in the text while they enhance the value of the book.

If one compares this with the 1st edition, the thorough manner of the editing to which this edition has been subjected, as well as the almost complete revision to which the text has been subjected, cannot but strike the reader. Better methods of treatment have taken the place of the old; newer drugs have been introduced —most of these are from the *United States Pharmacopoeia* and the *National Formulary*. But full use has also been made of information from the *British Pharmacopoeia* and the *New and Nonofficial Formulary* and *Remedies*. In giving the dosages of drugs both the metric and the apothecary systems are used, the latter printed in parenthesis. Wherever possible the American as well as the British name for a drug is given. This should help the non-American reader to follow easily as well as to get to know the foreign names of certain new drugs.

Much space has been given to the antibiotics, antihistaminics, sulphonamides, cortisone and ACTH. In connexion with the last two the authors take the trouble to warn their readers that 'these agents do not appear to "cure".' This is certainly a very necessary warning and they follow this up with a list of the dangers, 8 of these being listed, and they further discuss 'Controls to be Employed to Correct or Minimize Dangers'; and they wind this up with a further discussion of 'Contra-indications and Special Precautions'. If these warnings are properly taken to heart, less 'hit or miss' treatment by means of ACTH and cortisone will be indulged in.

Instead of the Sylvester and Schaeffer methods of artificial respiration, the Nielsen (Arm-Lift-Back-Pressure) method is recommended; descriptive text and diagrams are given. On the other hand, one would like to see the two illustrations on 'gastric suction and on tidal drainage of the urinary bladder restored to the text of future editions. Surely they are of greater use to the practitioner than the newly-added matter on '*Congenital Heart*

Disease' which might with advantage to other information be safely left out in future.

Notwithstanding the fact that the present edition contains 93 more pages of print, it is hardly bigger than the 1st edition. This has been achieved by rigorous editing, smaller type-face and thinner paper, but all this tends to strain the eyes more. One would like to suggest that in headings and sub-headings and points requiring stressing more use be made in future of bold type and less of italics.

However, this little book can confidently be recommended to practitioners, housemen and senior medical students as being a handy and practical addition to the bookshelf. It has only to be used to be appreciated.

G. C. A. v. d. W.

THE NATURE OF DISEASE

A Further Study in the Nature of Diseases. By. J. E. R. McDonagh, F.R.C.S. (Pp. 372. 21s.) London: William Heinemann Medical Books Ltd. 1955.

Contents: 1. Introduction. 2. The Nature of Disease. 3. The Blue Book. 4. The Buff Book. 5. Rheumatism. 6. Influenza in the Years 1950–51, 1951–52 and 1952–53. 7. Influenza in the Years 1950–51 and 1951–52. 8. Influenza in the Year 1952–53. 9. The Ductless Glands in Health and Disease. 10. Conclusion. Index.

The latest work by Dr. McDonagh on the nature of disease must be considered as a welcome event for, like all his earlier writings on the subject, it makes stimulating if provocative reading. The chapters on The Buff Book Rheumatism, Influenza in the Years 1950-51, 1951-52 and 1952-53, and on The Ductless Glands in Health and Disease reveal the author's burning passion for enquiry into the nature and causation of disease; but commendable as this may be, we are left in some doubt as to the validity of his analytical methods, and in a state of uncertainty in regard to his capacity for verbal expression. On page 3 appears the sentence: 'Death is by no means the inevitable result of the departure from health, or life; death is prevented from being an inevitable result of disease by expansion being automatically succeeded by contraction, and by the first region of the radiating portion of the fourth region of the attracting portion over-contracting to save "activity" from being obliged to take one of the two courses to the terminus'. Sentences like this—and there are many of them—are cumbersome and obscure. And finally we would say that the author's conception of causal relations is not likely to satisfy a mind trained in the present-day methods of clinical methodology. Thus when the author speaks of 'disease' we would prefer to speak of 'disease process', and what he conceives to be a cause—in the sense of *causa efficiens* of the philosophers—we would regard as a factor in the chain of causality, a chain which has its beginning, in many instances, in the multiform environment, and which traverses, by a process of interaction, the psychic and somatic segments of the human personality. This is medical science; the rest is mysticism.

L.F.F.

GYNAECOLOGICAL OPERATIONS

Die Gynäkologischen Operationen. Von Heinrich Martius. (Pp. 434 + xvi, with illustrations, some in colour.) Stuttgart: Georg Thieme Verlag. 1954.

In this useful reference volume all the standard gynaecological operations are described in the minutest detail, even abdominal incisions. All the operations are explained by superb illustrations.

Some of the opinions expressed are not quite in keeping with modern trends in gynaecology; for instance the author is in favour of total hysterectomy in cases of associated cervical pathology where a hysterectomy is indicated, but in the absence of cervical pathology he advises subtotal hysterectomy in young women. He quotes a mortality rate of 3·6% in total hysterectomy in a series of 2,305 cases and 1·9% in subtotal hysterectomy in a series of 4,575 cases. The corresponding figures in his own clinic for 4 years (1950-1953) were 3·2% and 1·9% in total and subtotal hysterectomy respectively. (These figures are the author's. The contrary has been found in many centres.)

The author states that the incidence of carcinoma developing in the stump is in the region of 0·6% and this therefore compares favourably with the much higher mortality of total hysterectomy; and furthermore 50% of these carcinoma cases are cured (quoting J. Ries of the Frauenklinik, München). He concludes that he is against the world-wide predilection for total hysterectomy.

The author regards the Schauta operation as effective as the Wertheim for carcinoma of the cervix. This opinion is shared by only a limited number of authorities. S. Mitra of Calcutta, who is an exponent of the Schauta opinion performs a pelvic lymphadenectomy in addition a few weeks after the radical vaginal operation.

This volume can be recommended for its operative technique.

J.B.N.

DIAGNOSIS IN CHILDREN

Pediatric Diagnosis. By Morris Green, M.D. and Julius B. Richmond, M.D. (Pp. 436 + xvii.) Edinburgh and London: W. B. Saunders Company. 1954.

Contents: Section I. The Pediatric History. *Section II.* Physical Examination. 1. The Pediatric physical Examination. 2. Examination of the Head. 3. Examination of the Head. 4. Examination of the Eyes. 5. Examination of the Ears. 6. Examination of the Mouth. 7. Examination of the Tongue. 8. Examination of the Lower Jaw. 9. Examination of the Salivary Glands. 10. Examination of the Teeth. 11. Speech. 12. Examination of the Throat. 13. Examination of the Neck. 14. Examination of the Chest. 15. Examination of the Heart. 16. The Breasts. 17. Examination of the Abdomen. 18. Anus and Rectum. 19. Genitalia. 20. Examination of the Skeletal System. 21. Examination of the Muscular System. 22. The Neurologic Examination. 23. Developmental Neurology. 24. Examination of the Skin. *Section III.* 25. Disturbances in Growth. 26. Failure to Gain; Failure to Thrive; Weight Loss. 27. Fever. 28. Edema. 29. Cyanosis. 30. Symptoms Referable to the Urinary Tract. 31. Symptoms Related to Sexual Development. 32. Coma. 33. Convulsions. 34. Intellectual Retardation. 35. Lymphadenopathy. 36. Leg Pains. 37. Tumors, Swellings, Masses. 38. Understature. 39. Gigantism, Overstature. 40. Obesity. 41. Anorexia. 42. Regurgitation and Vomiting. 43. Constipation. 44. Diarrhea. 45. Melena. 46. Abdominal Pain. 47. Symptoms Referable to the Respiratory Tract. 48. Cough. 49. Dyspnea. 50. Stridor, Noisy Breathing, Wheezing. 51. Pallor. *Section IV.* Health Supervision. 52 Introduction. 53. Prenatal Considerations. 54. Infancy. 55. Preschool Period (1 to 5 Years). 56. The School Years. 57. Adolescence. Appendix. Index.

The authors state in their preface that they 'have been concerned with helping students and practitioners increase their diagnostic skill through a systematic and integrated approach to patient study that can be readily applied at the bedside or in the office'. They have been very successful.

The book is divided into 4 sections, viz. (I) Introduction, which includes the Pediatric History, (II) Pediatric Physical Examination, (III) Signs and Symptoms, and (IV) Health Supervision.

Throughout the book great emphasis is laid upon the psychological aspects of development and disease—a greatly neglected topic in the past.

The physical examination is discussed in great detail. It is gratifying to see the art of clinical examination placed in its correct perspective in a modern text-book.

The chapters on fever, disturbances of growth, sexual development, and jaundice are excellent. However, some rare conditions, e.g. muscular dystrophy, have nearly a whole page devoted to them, while tuberculous spendylitis has only half a paragraph. As the book is strictly diagnostic, dissertations on therapy, e.g. surgery in poliomyelitis, are not entirely necessary.

The chapter on health supervision is extremely practical and full of useful data. It indicates the role of the physician in all aspects of child life commencing pre-natally and ending after adolescence.

The references are given after the up-to-date quoted extracts—a most useful method.

The book is full of accurate modern data and deserves to be recommended to all interested in the art of medicine.

J.L.B.

CANCER

Cancer. By Lauren V. Ackerman, M.D. and Juan A. del Regato, M.D. Second Edition. (Pp. 1201, with 702 illustrations. £9 11s. 3d.) St. Louis, U.S.A.: C. V. Mosby Co. 1954.

Contents: Part I. Chapter 1. Introduction. 2. Cancer Research. 3. Pathology of Cancer. 4. Surgery of Cancer. 5. Radiotherapy of Cancer. Part II. 6. Cancer of the Skin. 7. Cancer of the Respiratory System and Upper Digestive Tract. 8. Tumors of the Thyroid Gland. 9. Tumors of the Mediastinum. 10. Cancer of the Digestive Tract. 11. Cancer of the Genitourinary Tract. 12. Cancer of the Male Genital Organs. 13. Tumors of the Suprarenal Gland. 14. Cancer of the Female Genital Organs. 15. Cancer of the Mammary Gland. 16. Malignant Tumors of Bobe. 17. Sarcomas of the Soft Tissues. 18. Cancer of the Eye. 19. Hodgkin's Disease. 20. Leukemia.

The 1st edition of this book was an unqualified success, as shown by the fact that it was reprinted twice within 1 year of its publica-

tion. Now comes the 2nd edition, thoroughly revised and partly rewritten.

This is an excellent reference book on the diagnosis, treatment and prognosis of cancer. It is well produced and most liberally illustrated with over 700 photographs, graphs and diagrams. What will be of greater benefit is the most extensive list of references at the end of each chapter—here there is the very common American tendency of virtually ignoring the British literature on the subject.

The first part of the book is devoted to certain general considerations concerning cancer and its treatment. This is a most interesting section, giving valuable information on incidence, the early detection of cancer, carcinogenesis and general principles in cancer treatment.

The second part of the book deals in detail with cancer as it effects particular structures. Each section is described systematically, with a brief account of the relative anatomy followed by etiology, gross and microscopic pathology, clinical picture, differential diagnosis, treatment and prognosis. Although details of surgical and radiotherapeutic technique are not included, the sections on treatment are comprehensive accounts of modern therapy—a good example is the section on the treatment of skin cancer (excluding melanoma) which comprises 13 pages.

In a reference book of this standing it is difficult to single out any portions for particular praise but there can be no doubt that the chapter on cancer of the Respiratory System and Upper Digestive Tract deserves special mention, with almost 300 pages of the most detailed description of cancer in those areas. Similarly the chapter on cancer of the Mammary Gland is a model of its kind.

It is interesting to note that the authors feel that the evidence is suggestive that carcinoma follows chronic cystic disease of the breast in greater proportion than normally expected.

Here unquestionably is an excellent book which can be read with enjoyment and great benefit by all clinicians and should provide a valuable source of reference for a long time to come.

D. J. du P.

BLOOD GROUPS

Blood Groups in Man. By R. R. Race, Ph.D. (Cambridge), M.R.C.S., F.R.S. and Ruth Sanger, Ph.D. (London), B.Sc. (Sydney. Second Edition. (Pp. 400 + xvi. 30s.) Oxford: Blackwell Scientific Publications. 1954.

Contents: 1. Introduction. 2. Blood Groups and Human Genetics. 3. The ABO Blood Groups. 4. Secretion in the Saliva of the Antigens of the ABO System. 5. The MNSs Blood Group. 6. The P Blood Groups. 7. The Rh Antigens. 8. The Inheritance of the Rh Blood Groups. 9. Rh Antibodies. 10. The Lutheran Blood Groups. 11. The Kell Blood Groups. 12. The Lewis Blood Groups. 13. The Duffy Blood Groups 14. The Kidd Blood Groups. 15. Other Blood Groups. 16. Methods used in Blood Grouping. 17. Identification of Blood Group Antibodies. 18. The Multiplicity of Blood Group Combinations. 19. Blood Groups and Problems of Identity and Parentage. 20. Blood Groups and Disease. 21. Blood Groups and Linkage.

The 2nd edition of Race and Sanger, like the first, gives a full account of the more theoretical aspects of blood-group knowledge; it is thus complementary to the other British works—Mollison on clinical applications and of Mourant on anthropology. It is a first-class exposition and an essential book for blood-group workers and clinical pathologists, but I believe that many others, including those clinicians who do not take fright at blood-group nomenclature, will read it with unexpected pleasure. The science of biood groups is a complicated but very elegant subject, and Race and Sanger succeed in conveying, from first-hand experience, some of the excitement of the research worker. There are occasional most attractive touches of enthusiasm, such as the remark that CWde is 'a fine chromosome'.

This edition has 2 new chapters, on the Kidd groups and on linkage, and the others have been revised to include many recent advances such as blood groups and disease, the factor, and the extraordinary chromosome -D- which appeared briefly in an addendum to the 1st edition. Race and Sanger of course are hardened adherents of the theory of triple linked Rh genes which Fisher had the effrontery to suggest after it had been rejected by Wiener, and of the CDE notation for the Rh factors which causes such distress on the other side of the Atlantic. Genetic controversy apart, this approach makes life a great deal easier for the beginner who would like to understand Rh without superhuman efforts. Rh. without CDE is like arithmetic without Arabic numerals.

Criticisms are all very minor ones. Some reviewers objected to the order in which the chapters were arranged in the 1st edition; this has not been altered but I do not find it offensive. Altogether Race and Sanger is a very good book, and one that more than repays the labour of reading for review. This is high praise.

P.B.

ABILITY SCALES FOR BABIES

The Abilities of Babies. By Ruth Griffiths, M.A., Ph.D., F.B.Ps.S. (Pp. 229 + x, with illustrations. 20s.) London: University of London Press Ltd. 1954.

Contents. 1. Introduction. Part 1. Criteria for a New Technique for Testing Infants. 2. Observation of Normal Infants and Test Construction. 3. A Study of Other Tests and a New Classification. 4. Clinical Implications of the New Scale. Part 2. Standardisation of the Scale and Diagnostic Implications. 5. Standardisation of the Scale. 6. The Frequency Distribution and General Validity of the Scale. 7. Profile Studies of Normal Infants. 8. Differential Diagnosis of Mental Handicap in Special Cases. Part 3. Administering the Scale. 9. Environment for the Testing and Standardised Apparatus. 10. The Approach to the Infant in the Test Situation. 11. Administering the Locomotor Scale (Scale A). 12. Administering the Personal-Social Scale (Scale B). 13. Administering the Hearing and Speech Scale (Scale C). 14. Administering the Hand and Eye Scale (Scale D). 15. Administering the Performance Scale (Scale E). Appendix 1. Scoring the Tests and Assessing Results. Appendix 2. Complete Inventory of Test Items. Bibliography. Index.

In recent years, the work of Gesell and others has stimulated research in the difficult field of the management of intelligence and ability in young children. The book under review sets out the results of many years of investigation into the mental development of babies from birth to 2 years of age. Out of this investigation has come a system of approach which, the author claims, gives interpretive results parallel to those achieved for older children with the Binet-Simon and Terman-Nerril scales.

Dr. Griffiths uses a 5-scale test which has the following components: (1) a locomotor scale measuring muscular movements of all kinds; (2) the personal-social scale which assesses the child's progress within its social setting; (3) hearing and speech in the sense of active listening and the acquisition of a vocabulary of sounds to be built up into words and sentences; (4) hand and eye development with emphasis on manipulative activities; and (5) tests of performance and ability to reason. Each section contains 52 finely graded items arranged in order of difficulty, some 260 in all. Nevertheless, a series of tests for any one child can be carried out in less than 30 minutes.

The actual tests are detailed. At the end of the book there is an appendix in which all tests are itemized in tabular form for each individual month of age up to the end of the 2nd year of life. Much thought and careful painstaking investigation has been put into this work and the book is recommended in particular to the paediatrician, child psychologist and child psychiatrist. There are several illustrative diagrams in the text and 23 excellent photographs.

C.A.

PAEDIATRICS FOR THE PRACTITIONER

Paediatrics for the Practitioner. Edited by Wilfrid Gaisford, M.D., M.Sc., F.R.C.P., and Reginald Lightwood, M.D., F.R.C.P., D.P.H. Volume 3. Pp. 670+xi with 159 illustrations. 81s. 6d. London: Butterworth and Co. (Publishers), Ltd., South African Office—Butterworth & Co. (Africa) Limited, Durban. 1955.

Contents: 1. General Comments on Examination and Clinical Signs. 2. Congenital Malformations (including Hydrocephalus and Spina Bifida). 3. Injuries of the Central Nervous System. 4. Infections of the Nervous System. 5. Infections of the Nervous Systems. 6. Tumours, Cysts and Abscesses of the Central Nervous System: Neurofibromatosis. 7. Intracranial Vascular Lesions. 8. Degenerative Diseases of the Nervous System. 9. Cerebral Palsy. 10. Epilepsy and Convulsions. 11. Allergy—General. 12. Eczema—Atopic Dermatitis. 13. Urticaria. 14. Asthma. 15. Serum Diseases. 16. Drug Allergy. 17. Gastro-Intestinal Allergy. 18. Periodic Syndrome. 19. Allergic Rhinitis. 20. Congenital and Hereditary Disorders of the Skin. 21. Diseases of the Skin due to Physical and Chemical Agents. 22. Bacterial and Virus Diseases of the Skin. 23. Fungoid and Parasitic Infections. 24. Heoplasms of the Skin. 25. Other Disorders of the Skin' 26. Hereditary and Congenital Defects: Birth Injury. 27. Cataract. 28. Refractive Errors. 29. Infections: Injuries. 30. Disorders of the Eyelids, Lacrimal System and Orbit. 31. Abnormality of the Ocular Fundus. 32. Retrolental Fibroplasia. 33. Virus Diseases. 34. Rickettsial Infections. 35. Bacterial Infections. 36. The Treponematoses. 37. Leptospirosis (Including Weil's Disease or Leptospirosis Ictero-haemorrhagica. 38. Rat Bite Fever. 39. Mycotic Infections. 40. Toxoplasmosis. 41. Diseases of Muscles. 42. Fractures and Joint Injuries. 43. Chronic Non-Tuberculous Bone Infection. 44. Tuberculosis of Bones and Joints. 45. Acute Infections of Bones. 46. Osteochondritis Juvenilis. 47. Congenital Malformations and Acquired Deformities. 48. Bone Tumours. 49. Surgical Approach to Paralysis. 50. Peripheral Vascular Disease in Children. 51. Pink Disease. 52. Rheumatiod

Arthritis (Still's Disease). 53. Acute and Subacute Generalized Lupus Erythematosus. 54. Dermatomyositis and Similar Diseases. 55. Polyarteritis Nodosa. 56. Sarcoidosis. 57. Endocardial Fibro-Elastosis. Index.

This volume, the last of the series of three, maintains the standard of its predecessors. Like them it gives the practitioner in search of information a brief survey of the known facts on the subject without obliging him to spend time sifting them out from a long dissertation.

This might even be the most valuable volume of the three since, among other things, it deals with diseases of the nervous system and the infectious fevers. In both these fields the general practitioner is likely to look relatively frequently for text-book assistance. Examination of the nervous system of the infant and young child is not easy, and the interpretation of the results of examination often difficult; and the section on examination of the nervous system and the clinical signs of nervous disorders will be found to be most helpful. The section dealing with the infectious fevers is clear and, mostly, explicit though in the treatment of acute pyogenic meningitis massive therapy is mentioned several times but nowhere defined. The dermatological section is probably not the least helpful section of the 3 volumes, though it inclines towards the use of violently coloured remedies which are unlikely to find much favour with the parents. A considerable number of relatively rare conditions are discussed with commendable brevity but the whole opthalmological part has suffered from too much condensation. It is very clear and concise but so concentrated that it has practically crystallized. Strabismus is discussed in 2 pages. Myopia, hypermetropia, and astigmatism—which the practitioner has to explain to the parents with some frequency and at some length—are together allotted 2 pages, while retrolental fibroplasia, which in some parts of the world is now a major cause of blindness, is allowed 3 pages for an admirable survey.

There is a small note above the index to this volume stating that a general index for all three will be published. Whether this is part of the series—and the purchase—or whether it is an optional addition is not stated, but the indexing of each volume would be sufficient for the most purposes.

In the review of the first volume of the series it was stated that the financial outlay involved would be justifiable. After perusal of the second and third volumes, that comment is still valid.

F.J.F.

MEMORIES OF THE DISSECTING ROOM

Living with the Dead. By D. J. Coetzee. Second Edition. (Pp. 89. 10s.) Printed in Holland. 1954.

There is something particularly pleasing about recollections of one's past, and the smell of formalin can still evoke in the decrepit doctor pleasant memories of his days in anatomy before the shades of the prison-house had quite closed about him. This book, now in its 2nd edition, should, for Cape Town men at least, have something of the same effect. Mr. Coetzee is a character; a conoisseur of coffee, an expert manufacturer of neckties, and the possessor of a piano guaranteed for 5,000 years. His book may safely be offered to a maiden aunt of reasonably progressive views, and in spite of one or two minor imperfections it should give amusement to all who passed through the Cape Town department under his benign supervision.

P.B.

CORRESPONDENCE : BRIEWERUBRIEK

ANAL FISSURE

To the Editor: Mr. Eisenhammer[1] is, I think, justifiably impatient with your contributor in the Revision Series for perpetuating a method of treatment which is unsatisfactory, unreliable and time-consuming for the patient. His own operation of internal sphincterotomy is a very important contribution to the subject. It is displacing the older procedure rapidly. But perhaps a prophet has no honour in his own country.

George Sacks

National Mutual Building
Church Square
Cape Town
1 June 1955

1. Eisenhammer, S. (1955): S. Afr. Med. J., **29**, 532 (28 May).

TREATMENT OF TUBERCULOSIS BY THE GENERAL PRACTITIONER

To the Editor: I have read the letter on this subject from the medical officers of the Alexandra Health Clinic in your issue of 14 May 1955[1] (page 488) with astonishment and alarm. Never before have I seen published so much arrant and arrogant nonsense in relation to the general practitioner.

Despite their wide experience in conducting a domiciliary tuberculosis service in an African township where tuberculosis is prevalent and rife, your correspondents have not adduced a single, cogent, substantial or convincing argument to show that the general practitioner is incapable of treating pulmonary or any other form of tuberculosis.

On their own admission modern antibiotics have simplified the management and treatment of such cases.

Analysing the situation more carefully, we find that in the first instance a tentative diagnosis or a differential diagnosis of tuberculosis can be made by a practitioner who cares to elicit a careful history and who is acquainted with clinical methods of diagnosis. To confirm this clinical diagnosis, whether made by a specialist or general practitioner, the services of a number of auxiliaries must be sought.

In the first place a specimen of sputum will be sent to the bacteriological laboratory, where either a bacteriologist or technician will perform the necessary tests. Should these prove positive for *M. tuberculosis*, further steps will be taken to secure the services of a radiologist or radiographer to assess the extent of the damage on X-ray films. Here I would go so far as to say that the general practitioner in the platteland may be better equipped to perform this service than either his specialist or general-practitioner colleague in the town since he generally has acquired some radiological technique. Should the opinion of the radiologist, radiographer or G.P. radiologist indicate that the damage is amenable to surgical intervention, the services of a thoracic surgeon will be invoked.

Should the case not be suitable for surgical intervention then one can resort to the use of antibiotics, rest or collapse therapy (pneumothorax being a treatment little used today but still having a considerable value in selected cases).

Surely it is not beyond the capacity and skill of the general practitioner to emulate his specialist colleague in prescribing and regulating the dosage of 3-4 antibiotics used for the purpose, viz. streptomycin, dihydrostreptomycin, PAS or INH, the dosages being readily available to any one who can read, and to follow the progress of a case of tuberculosis from day to day and week to week and if necessary refer the case to the various auxiliaries mentioned for opinion or report.

It is in my opinion outrageous to say that the general practitioner fails to notify the relevant local authority, since this is compulsory by law. Do your correspondents suggest that the specialist is a more law-abiding citizen than the general practitioner?

I am seriously perturbed by the prejudice against the general practitioner and the ignorance of conditions of general practice exhibited by our colleagues in full-time institutional practice, and am anxious to learn whether any of the signatories to the letter has ever been in general practice.

It would be interesting to know what sort of specialist your correspondents envisage. A tuberculosis specialist or a chest physician, and, if the latter, would it be one for the right lung and another for the left lung?

E. Meltzer

P.O. Box 543
Benoni
29 May 1955

1. Cormack, M. A., Hathorn, M. K. S., Stein, Z. A. and Susser, M. W. (1955): S. Afr. Med. J., **29**, 488.